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ON THE DISCOVERY OF GREEN SAND IN THE CALCAREOUS DEPOSITE OF EASTERN VIRGINIA, AND ON THE PROBABLE EXISTENCE OF THIS SUBSTANCE IN EXTENSIVE BEDS NEAR THE WESTERN LIMITS OF OUR ORDINARY MARL.

William and Mary College, June 26, 1834.

To the Editor of the Farmers' Register.

Since my attention was drawn to the nature and properties of the New Jersey Green Sand, by the specimens which you sent me for analysis, and by our more recent conversations on the subject, I have made a visit to the region in which it is found, and have witnessed the most striking evidences of its utility as a manure. During this excursion, I examined the marl in all its varieties, and learned many interesting particulars respecting its use, from intelligent farmers, long experienced in applying it to the soil. I have moreover analyzed several specimens collected on the spot with the view, if possible, of throwing some light upon its agency when applied to the soil.

Since my return, I have made diligent search for this substance in our marl beds and the accompanying strata, and am at present directing my inquiries to that region of Lower Virginia in which, according to geological laws, as well as from some indications of which I have heard, this deposite may reasonably be expected to occur. As far as relates to the marl beds of this vicinity, my search has been unexpectedly successful. With scarce a single exception, I have discovered particles of the green sand, mingled with the ordinary sand, clay, and shells; and in some instances. in so large a proportion as no doubt greatly to enhance the useful agency of the calcareous matter. Indeed, I am inclined to believe, that in some cases, the agricultural efficacy of the marl is chiefly owing to the green sand which it contains. In this conclusion I think I shall be sustained by facts hereafter to be noticed.

The general occurrence of this substance in our marl beds, is certainly a discovery of some interest; and though I may perhaps exaggerate its importance in a practical point of view, I cannot but think that it is worthy of the attention of our farmers. I speak of its *general* occurrence, because, although I have examined but few specimens from a distance, the general resemblance of our marl deposite throughout, together with the almost invariable presence of the green particles in such as I have inspected, would seem to justify the conclusion that it is a usual accompaniment of our marl formation, though by no means in equal proportions in all localities. Out of more than forty specimens which I have examined, there were only two in which the green particles could not be discovered; and as they frequently occur in patches, and not generally diffused throughout the bed, it is probable that even in the beds from which these two specimens were procured, the green sand might be elsewhere found. Some of the most efficient marls in the neighborhood of Williamsburg, contain a marked proportion of this substance. At Burwell's Mill, (three miles below the city towards Yorktown) the intermixture is so large, that the sand and *detritus* of shells washed down by the spring freshet display a very distinct greenish olive tinge, which even travellers observe as they pass through the valley in which the deposite exists. At this place, the shells, as they are taken out of the extensive bank recently exposed by the torrent, are frequently filled with a dark mass containing as much as thirty per cent. of the green particles. In fact the whole bank is strongly tinged by them and the stratum which overlies the shells, in some places five feet in thickness, is precisely similar to some of the poorer deposites in New Jersey, and contains upwards of thirty per cent. of this substance. In Judge Semple's marl beds, in the same vicinity, the green particles are equally abundant—and, as in the former case, extend into the incumbent stratum of non-calcareous matter. In many instances, this layer of overlying earth has been found even more efficacious on the soil than the subjacent marl—a fact which might naturally be inferred, when the green particles abound chiefly in the upper stratum, from the extraordinary efficiency of the green sand as experienced in New Jersey. But by far the most interesting locality of this substance in point of extent, which I have examined, occurs on the shore of James river, adjacent to King's Mill and Littletown. Here the banks rise perpendicularly to the height of from forty to sixty feet, and for about three-fourths of this elevation are composed of shells and earth mingled with a large proportion of the green sand which in some places imparts a distinct color to the surface. The sand of the beach is also filled with these particles which the rains have washed down, and which, at first view, present the appearance of the common black sand of our river, though in much larger quantity. At Bellefield, and other places on the York river, the banks and beach are similarly impregnated.

The green particles may be readily recognised by their want of lustre, the ease with which they may be bruised with the point of a penknife, and the bright green stain which they then produce. In examining earth or marl in which they are very sparsely scattered, the particles are sometimes difficult to separate from the other matter. My method is to moisten the end of the knife blade by applying it to the tongue, and then to remove several of the particles by adhesion. When placed upon a card and bruised, they leave a brilliant stain. This test may be confidently relied on.

The occurrence of the green sand so extensively through our marl region, affords strong grounds for hoping that valuable beds of this substance, like those of New Jersey, almost entirely unmingled with other matters, may be brought to light by a judicious and enterprising examination of the district on the western limits of our marl. And should such a discovery be made, the agriculture of Lower Virginia would become possessed of a new and powerful auxiliary in furthering its already rapid career of amelioration. Even the fact

that the green sand often exists in considerable quantities in and above our ordinary marl beds, which is I think now sufficiently established, may furnish no unimportant aid in the improvement of our lands, by leading to a more varied and judicious adaptation in the application of our manures.

Independently of the existence of the green sand in a scattered state in our calcareous strata, there are other and stronger reasons for believing that a deposite similar to that in New Jersey will be found in the appropriate region. In a geological arrangement of our various formations, the marl beds of Eastern Virginia and Carolina, as well as those of Maryland, belong to a later period in the physical history of our country, than the green sand formation of New Jersey—the former being referred to the tertiary—and the latter to the secondary epoch of geologists. Now this tertiary deposite extends into New Jersey, and is found in many places in the latter state nearly contiguous to the green sand. Moreover, indications of the New Jersey formation have been found in Maryland—and such is the general regularity with which the different geological deposites are arranged, that we may fairly infer the existence in Eastern Virginia of the green sand, or some deposite equivalent in a geological point of view—though at the same time it by no means follows that the green sand, if actually found, would be sufficiently near the surface to render it extensively available as a manure. The object however is of such magnitude, as to justify a very diligent examination, and I am therefore desirous of enlisting in this research all those readers of the Register who reside in the region which has been alluded to before. As however the success of this investigation will be greatly promoted by an acquaintance with the indications by which the green sand, or its geological equivalents are to be recognised, and some knowledge of the properties and constitution of the substance itself, I shall here give a brief account of the New Jersey formation which I visited, together with the result of several chemical analysis of the sand carefully executed by myself and others: and further to interest your readers in this important inquiry, I shall add a statement of such facts bearing upon the application and agency of the marl, as I was enabled to collect during my visit to the beautiful region which it has so largely contributed to fertilize and adorn.

The New Jersey green sand is apparently identical with that series of deposites recognised in Europe by the name of the green sand formation, characterised by a predominance of minute green particles in many of its strata. In Europe these strata are generally found alternating with beds of chalk; but in this country no chalk is found, unless in the region west of the Mississippi. The fossils embedded in the green sand on both sides of the Atlantic, are however so strictly alike, that the geological equivalence of the American and European beds can scarcely admit of question; and is therefore generally conceded as an established point. It is relevant here to remark that in tracing cotemporaneous or equivalent geological formations in different regions, geologists are accustomed to rely almost exclusively upon the fossils, whether shells, bones, or vegetable remains, which the strata may contain—a procedure to which they have been led by the whole tenor of modern developements in geology. Now with reference to the New Jersey formation, though it would be impossible without numerous drawings, and much descriptive matter, uninteresting to general readers, to convey a knowledge of even the principal shells and other fossils existing in the green sand, some account of a few of these fossils may possibly be useful in the inquiries which I trust many of your readers will be prompted to undertake.

1st. *Lignite*, or carbonized wood, often associated with iron pyrites of a bright yellow lustre, frequently occurs in the beds overlying the green sand formation, though it sometimes occurs in other situations.

2nd. *Amber* is often found in a similar position, as was the case at the Delaware and Chesapeake Canal.

3d. *Belemnites*—a fossil of a yellow or brown color, in shape somewhat like a cigar, but rather thicker—very brittle, and usually found broken transversely so as to exhibit its tubular character within.

4th. *Ammonites*—a fossil presenting the appearance of a snake coiled up in a flat coil, and frequently large and ponderous.

5th. The *Echinus*, or Sea Urchin—sometimes globular, at other times much flattened, having numerous little warty prominences, and minute perforations symmetrically arranged on its surface, and when entire, occasionally furnished with spines or prickles.

6th. *Gryphæa*—a shell having one valve very deep and convex, and the other flat. It somewhat resembles the small shell (chama) very abundantly found in our marl beds. This latter is smaller—has a rougher exterior, and has two muscular impressions in each valve—whereas the Gryphæa has but one.

7th. *Exogyra*—a shell like the former, with one convex and one flat valve—but a great deal rougher and more irregular in aspect, and of large dimensions.

8th. The *Falcated Oyster*—a beautiful shell about one and a half or two inches in length and bent like a Turkish scimetar.

These rude descriptions, which have no pretensions to scientific accuracy, are designed to draw attention to such fossils as may be brought to light in the region in which the green sand may be expected to occur—and in this point of view may prove of real value in examining for that deposite. Of course a scientific inspection of the fossils would be necessary to establish their identity, but this can readily be procured by transmitting them to the Academy of Sciences in Philadelphia, or by sending them to William and Mary, where they would be carefully examined and compared with the New Jersey fossils as collected and described. Indeed there is reason to believe that some of the characteristic fossils have already been found in Eastern Virginia. A bed of Lignite has been lately discovered on the Rappahannock, a few miles below Fredericksburg, the very point at which it might be expected to appear, and from information recently received, I am disposed to believe that Belemnites may be found near the mouth of Potomac Creek. It has been said also that the Gryphæa has been found, but I have not heard in what vicinity. These facts should furnish an additional stimulus to inquiry, and literally no stone

should be left unturned in pursuit of so important a discovery.

The New Jersey green sand is generally found in the valley and meadows, though occasionally it rises to some height in the surrounding hills. Its depth in many places is very great, and several strata occur, separated by layers of shells, or blue clay, or sand colored by iron. The general aspect of the green sand is that of a bank of moist bluish clay—though in some places the green tint is very perceptible. This however only occurs where the earth is dry. When thrown into heaps by the side of the pit, the mass falls into a coarse powder, in texture and color very closely resembling gunpowder, on which account it is very commonly known by the name of *gunpowder marl.* This mass consists in very large proportion of the pure green sand, having a slight admixture of clay, and in many places of minute fragments of shells. Occasionally, the bank presents a mass of the pure green sand itself—and again, in some places the shells predominate. In one of the beds in the vicinity of New Egypt, I discovered small spiculæ of gypsum, or sulphate of lime: but this occurred at no other locality—and in this place the crystals were so minute and few in number as to require the use of a microscope to be seen distinctly. The moist marl when warmed in the hand exhales a strong phosphoric odour, a fact which I believe has not been hitherto remarked.

As already observed, the marl frequently contains shells both in an entire and broken condition. This however is by no means universal. In fact, the great majority of those beds in actual use contain either no calcareous matter, or a very minute proportion of it. This I ascertained by chemical examination. In the vicinity of Arney's Town, Crosswick's Creek, and Shrewsbury, as well as other places, much of the marl which the farmers spread over their land, contains no carbonate of lime; while at New Egypt the calcareous and non-calcareous marls are both extensively employed. The same is true likewise, of the beds farther south at Mullica Hill. The green particles themselves have an invariable composition—and those of our Virginia marl beds are perfectly identical with those of the New Jersey deposite. Thirty grains of the green sand yielded by careful analysis—

Silica,	15.51 grs.
Protoxide of iron,	7.56 "
Potash,	3.10 "
Water,	3.00 "
Magnesia, a trace.	

These results agree very closely with the determination of Berthier of France, and Seybert of Philadelphia. The former operated upon the green sand of Europe, the latter upon that of New Jersey. It appears therefore that the predominant constituents are silica and oxide of iron. The potash, amounting to about ten per cent. is most probably the ingredient chiefly concerned in the agricultural agency of the marl, though in what way its connexion with the other ingredients is severed when the marl is spread upon the land, I am at a loss to conjecture.

Throughout all the district in which this deposite occurs, it is extensively employed in agriculture. In the neighborhood of Arney's Town, one of the points which I visited, it has been used as a manure for the last thirty years—but its general introduction is of more recent date. In the region in which the marl chiefly abounds, the soil is loamy, having in some places a large intermixture of tenacious clay. East of this tract, which is a narrow band nearly parallel to the Delaware River, the country assumes an appearance very similar to that of the sandy lands of Eastern Virginia, covered with a thick growth of pine, and comparatively unproductive. On both these varieties of soil the green sand is continually used with the most striking benefit. For the clay soils, the more sandy marls are of course preferred; and for the sandy soils, those which contain some clay along with the marl. The proportion in common use near Arney's Town, is from ten to twenty loads per acre. In other places five loads or even less is found to be sufficient. The action of the marl appears to be very permanent, as will be evinced by the following statement. In a large quadrangular field over which I walked, four successive applications of the marl had been made at intervals of four years—commencing about twenty years ago. The first dressing was applied to the north side—the second to the south—the third to the east, and the fourth to the west—while a small space in the centre was left without any marl. All four sides were covered with a very heavy crop of clover, which was nearly, if not quite as luxuriant on the north as either of the other sides—while the space in the middle was almost bare. The action of the marl appears to be most powerfully felt by clover and grass—but it is very conspicuous also with small grain and corn. A very intelligent farmer told me that it more than tripled his clover and grass crop, and doubled his small grain. In general it is spread upon the clover every fourth year, and ploughed in for the next crop. That it is very efficient upon sandy soils is evinced by the following striking fact. Some years ago an enterprising farmer near New Egypt, purchased two hundred acres of the Pine Barren, which, by marling, he has converted into pasture sufficient for one hundred head of cattle. Such is the demand for the marl, even at a considerable distance, that it has become an article of great profit to the proprietors of the pits, and more than one individual was pointed out to me who had risen to wealth by the sale of marl.

From what has been stated it will at once be evident, that the discovery of extensive and accessible beds of this manure in Virginia would be a most important accession to the resources of the state, and that an active and diligent search ought forthwith to be commenced throughout all the region in which there is a probability that it exists. Every aid which it is in my power to give, will be cheerfully bestowed in furtherance of this inquiry: and as I feel the double interest of a scientific curiosity, and a sincere solicitude for the agricultural prosperity of our state, I shall gladly receive all fossils and other specimens which may be transmitted for inspection or analysis, giving them a prompt attention, and communicating in reply such hints as may promise to be most useful in this deeply interesting and important investigation.

WM. B. ROGERS.

A CHEAP AND USEFUL WATER-CART.

From the British Farmers' Magazine, [of February 1834.]

I subjoin a description of a very cheap and useful water-cart. A barrel, holding 100 to 200 gallons, is placed on a pair of wheels and shafts in the usual way. A pump, three inches in diameter, is placed close by the side of the barrel, and to the under end of the pump is made fast a leather pipe of indefinite length, with a rose copper end, and in the pipe small copper or tin rings are placed, two inches distant, to prevent the external air from pressing together the sides of the pipe, and thus excluding the water. The cart being placed on the bank of a river, brook, or pond, and the pipe thrown into the water with the rose end immersed, a man will pump 150 gallons in 10 minutes, without the trouble of having a road into the bottom of the river, and with the great advantage of the horse standing dry, and not plunged into three feet of cold water in a winter day, in the usual way of filling by ladle and standish. A stop cock is fixed behind for discharging the water. When the cart is travelling the leather pipe lies over the barrel, fastened by two iron catches.

The barrel being filled, and driven to the place required, the leather pipe is immersed in the barrel by a hole in the top, sufficient to admit the rose end. A small iron rod screws down by the side of the piston rod, upon the upper valve, and shuts it fast. A rising main, with a check valve, is opened between the two buckets in the pump, upon which is screwed fast a leather pipe with a copper tube on the end. One man directing this pipe, and another pumping, converts the cart into a sort of fire engine, that may be very useful in cases of emergency, throwing the water 40 feet horizontally, and over any house of two stories, any hay stack or corn rick, and also very useful for garden walls and fruit trees. By increasing the size of the barrel, and by applying more power, a very sufficient engine may be made, and answering other purposes at the same time. The above described is very simple and cheap, and is very useful.

JOHN DONALDSON.

ON REAPING WITH THE SCYTHE.

[It is not only interesting, but profitable, to compare our own opinions and practices with those of other farmers having the same general object in view, but placed under very different circumstances. For want of making such comparisons, we fall into one of two errors, which are directly opposed to each other. We sometimes refuse to copy a plan adopted in England, for example, because we consider the difference of existing circumstances renders it altogether unsuited to our use: and in other cases, we assent without dispute or examination, to the superiority of some process in that country, because the operations of agriculture there are in general so much more perfectly performed, when perhaps in truth, our own labor saving substitute is preferable, and would be adopted by English farmers, if the same want of means for comparison had not kept them even more ignorant of our improvements than we are of theirs.

The piece which we will present below, furnishes a striking illustration of the ignorance of both countries of the practices of each other. The cradled scythe which the scarcity of labor, and the former general lightness of our crops of wheat, forced us to adopt in the United States, instead of the English sickle, or reaping hook, and which has become so perfect an implement by successive improvements, has never been known in England. But, it has been supposed by us that this rejection of this implement so indispensable here, by British farmers, was a proof that their mode of reaping wheat was still more perfect than ours; and that if we could command enough hired labor in harvest, and at as low wages compared to the value of the crop, that we would profit by exchanging our scythe and cradle, for the English sickle. But it seems that our mode would have been preferred by English farmers if they had known it, and that they are now beginning to adopt, as a new and valuable improvement, a mode of reaping similar to ours, but (as we infer) still greatly inferior. The Hainault scythe (alluded to below) which Sir John Sinclair saw used in Belgium, and the introduction of which he strongly urged in England, was formerly used in New York, where it had been brought by the early settlers from the Netherlands, but was abandoned for the scythe and cradle. The scythe described in the following article is connected with a sort of a cradle, but certainly very inferior to ours. We omit the plate, but can make its form perfectly understood by referring to our cradle, which is familiar to every reader. The sned (or snead) has a handle for the left hand, as well as one like ours for the right. The blade is perfectly straight except at and very near the point, in which short distance the curve is much greater than in our blades, which curve gently throughout, and mostly towards the point. To our eyes, the English blade would seem totally unfit for its purpose. The fingers are only three in number, and would be precisely represented by the three fingers next the blade of one of our cradles being cut off, so that the lowest was left only one third the length of the blade, the next something longer, and the third (and most distant from the blade,) about half its length. They are all straight. They are unfit to catch and hold the cut wheat as do our cradles of five or six curved fingers nearly as long as the blade. But even this addition is objected to in another and later article which is in the succeeding No. of the Quarterly Journal of Agriculture. This states that—

"About 30 years ago an attempt had been made, (in 'Aberdeenshire) and persisted in for two years, to cut the 'corn crops with the scythe; but as a notion had been then 'entertained, that it was indispensable, for laying the 'ears even, to attach some sort of additional machinery 'to the common scythe, and which was attempted in the 'form of a comb or heckle projecting above the blade, 'the scheme became abortive, owing, as experience 'now teaches us, to that very notion; and all thought 'of employing the scythe for harvest work passed 'away, till it was again revived at the time above 'stated. The implement now employed is just the 'common scythe, universally in use over the kingdom 'for cutting grass and clover-hay. No change whate-'ver is made in it for cutting heavy or lodged grain-'crops; but for light standing crops, a very simple ad-'dition is found of advantage. This consists of a small 'rod or shoot, nearly an inch in diameter, of green 'willow, or rowan or broom, or any other flexible and

'tough young wood. It has its thick end twisted into 'the small iron rod, which aids in attaching the blade 'of the scythe to its handle, named provincially the 'grass-nail. Its small end passes over the upper side 'of the blade as far as the back, where it is bent up-'wards in an even curve, and is brought backward, 'and tied with several rounds of strong twine to the 'handle, about 15 inches above the blade. A piece of 'strong iron wire is sometimes substituted for the wil-'low rod; but the latter is more approved of, being 'more easily adjusted to the nature and lay of the crop, 'according to the judgement of the scythesman."

From this passage, it seems that in fact the British reaping with the scythe approaches in simplicity the mowing of grass: and if so, and the wheat can be laid straight enough to be saved well, there would be a great advantage found in exchanging for that mode, our cumbrous and expensive scythe and cradle, however superior it may be to the sickle, or the implement described in the following article.

We have omitted those portions of the piece which do not relate specially to the operation of reaping.]

From the Quarterly Journal of Agriculture.

It is certainly a remarkable circumstance in the history of mechanical science in this country, that the art of cutting down the cultivated crops should be so inadequately supplied with instruments. The tools which are employed in every other art evidently display an ingenious adaptation of means to an end. Not so the reaping-hook. Unlike every other mechanical instrument, it is the physical power and dexterity of the laborer alone which constitute the efficacy of the reaping-hook. Its extremely simple form cannot alone have prevented the invention of a substitute. The knife and the spade are as simple in form as it; and yet the former has been displaced by many mechanical contrivances to which the power of steam is applied; and the latter is insignificant, when compared to the plough moved by the power of the horse, in every operation of magnitude in the field. Like the spade, the reaping-hook may be useful in the minuter and lighter operations of the garden; but its continued use in the field is attended with immense loss of time and money. It is nevertheless an efficient implement for executing good work in the hands of the dexterous laborer; though there is no single operation in farm management which is attended with the annual outlay of so much money, and the waste of so much valuable time, and so dependent, at the same time, on adventitious aid, as the reaping of the culmiferous crops. The expense incurred at harvest-work with the reaping-hook is seldom under 12s. an acre. Judging only by the magnitude of the work, it might surely be executed by horse or steam power for a third of that sum. One hundred acres of corn costs an outlay of money to the extent of £60 a year for reaping. Of this sum, £45 a year is expended uselessly; and which in the course of nineteen years' duration of a lease, with the simple interest thereof, would amount to nearly £1000—a sum which, if saved would purchase many comforts for the declining years of life. We say this sum is expended uselessly, for it is generally carried off by strangers. The time, too, which the reaping alone of the corn occupies is generally three weeks—a period much too long for the precious fruits of a twelve-month's toils to be exposed to the vicissitudes of a variable climate.

These difficulties were long felt, without being attempted to be remedied. Attempts, however, were at last made to substitute machines driven by horses for the reaping-hook. They have not yet been crowned with success, though they have no doubt laid a foundation upon which some future contriver, more ingenious than the rest, may erect a simple and useful structure.

Simple as the reaping of corn appears to a spectator, it is in reality a very troublesome sort of work. The cutting it down by the ground is not the only consideration which is required. All the manipulations which the corn has to undergo in future must be, and can only be, facilitated at harvest. It must be bound up into sheaves, for the conveniency of transportation. It must be exposed in small portions to the sun and wind for a time, before it can be safely preserved in large quantities; it must be carried off in small quantities at a time from the fields to a more convenient place to be preserved, and to pass again through hands in the thrashing and cleaning process, before it can be made available to the consumer. That machine must be very ingeniously constructed, indeed, which can prepare a crop of corn for all these successive but necessary manipulations.

Our surprise may therefore be a little abated at the hitherto unsuccessful attempts in the construction of reaping machines, when we consider the nature of the work which they have to perform. Though much ingenuity has been displayed in both Mr. Bell's and Mr. Mann's reaping-machines, they cannot, it is evident, realise all our expectations on that subject. That of Mr. Bell cuts the corn so surely, that not a single straw can escape; but it does not lay the swath of corn, when cut, in a direction at right angles to the line of draught, which it must be made to do before the corn can be taken off the ground in the best and most expeditious manner to be bound into sheaves. It appears to us to require considerable power to move it; and it certainly requires more dexterity to manage its motions than the generality of ploughmen possess who have the charge of farm-horses. Mr. Mann's machine lays the corn at right angles to the line of draught, and therefore more perfectly than Mr. Bell's; though it is questionable, if it will be able to cut it so surely. Mr. Mann's appears to be as easily moved with one horse as Mr. Bell's is with two. Mr. Mann's has not yet received a fair trial. Would a combination of the best parts of the two machines effect the cutting and laying down of the corn in a satisfactory manner?

But however well these may be simultaneously accomplished by the same machine, no reaping-machine can be said to approach nearly to perfection, that only reaps, and lays down the corn when cut in a swath; but which does not collect the corn into bundles, ready to be bound into sheaves. Farther than this it is perhaps beyond the power of machinery to accomplish in this kind of work, though short of this no mechanician should rest satisfied with the capability of his reaping-machine. The making of bands, the binding of sheaves, and the setting of stooks, must be confided to manual dexterity. The locomotion necessary to a reaping-machine, when in the per-

formance of its work, will always present an obstruction to the perfection of its construction; though many greater mechanical difficulties have already been surmounted by our ingenious artisans. An insurmountable difficulty will sometimes be found to the use of reaping-machines in the state of the growing corns. A portion of it may be standing erect, or only a little swayed, while others may be twisted and laid flat in every possible direction. High winds and heavy rains may ravel and beat down a whole crop in a single day. With the corn in that state it will be impossible to derive much assistance from the reaping-machine. Fortunately a laid crop is not of very frequent occurrence, though, to a partial extent, portions of laid corn will be found on every farm in every season. To reap three-fourths, or even one-half, of the crop with efficient reaping-machines will insure a considerable saving, though the laid portions may have to be reaped with the sickle.

Until the appearance of an efficient reaping-machine, much saving of money may be effected in reaping by the substitution of the scythe for the sickle. The scythe has long been in use in agriculture, and powerful as the implement is in the hands of the laborer, in comparison with the sickle, it is surprising it has not been more used at harvest-work in this country. It is used in France and Switzerland, in many parts of England, and in Aberdeenshire. The Hainault scythe takes up an intermediate position between the scythe and the sickle. The scythe can only be wielded by stout men, and whatever work is performed by it requires the assistance of laborers besides the mower. These circumstances have no doubt had the effect of restricting the use of the scythe. On the other hand, every boy and girl, as well as grown up person, can assist at harvest-work with the sickle. * * * * *

The land must be prepared by rolling for the use of the scythe. Clods and stones soon blunt and break the edge of the scythe: the roller should be heavy. All stones which are not compressed into the soil by the weight of the roller should be removed, and this is easily accomplished by mounting a box on the frame work, into which the man who drives the horses can throw the stones if they are few in number, or should they be numerous, another person can follow the roller and lift them up. The stones can be disposed of at the ends of the field. The best time to carry off these large stones is when the field is preparing for the crop which is to be rolled. Rolling the whole crop imposes, it is true, additional labor in spring; but it is absolutely necessary when the scythe is to be employed in reaping. Wheat is generally rolled at any rate after the grass-seeds are sown in it in spring, and most people prefer rolling the barley after it is sown, in order to make as smooth a surface as possible for the braird of that kind of grain, so that the additional labor only consists in rolling the oats. It is always advantageous to roll oats early in a dry season to prevent the ground becoming too dry, for of all the culmiferous crops the oat is most affected by drought.

The scythe employed in reaping corn requires more nicety in the construction of its several parts than one for common purposes. The blade should be of patent steel, strengthened by a plate of iron along the back, and its temper should not be too hard, which can be determined by examining closely the edge of the blade, and observing that it is smooth and not serrated. A good mower always prefers a long blade, more than four feet in length. The shank or sned should always be straight and not curved. The curved may seem more convenient in form to the hand, but as the line of draught must always be straight, the straight sned always gives the greatest command over the scythe. A well dried young larch tree, barked and reduced by the plane to the desired thickness, with a natural slight curve outwards at the root end of the tree for receiving the blade in a proper position, makes the best sned for reaping. When painted, such an one will last for many years. A hone of fine sand to preserve a fine edge, and a fine sandstone to whet the edge of the scythe occasionally, are necessary appertenances. To gather the corn and lay it down in a regular swath when cut, a simple apparatus called a rake or cradle is attached to the scythe. This rake, as its name implies, consists of three long teeth, diminishing in length from the uppermost to the undermost, fastened to an upright stem, and strengthened by two rods passing through them parallel to the stem. It should be wholly made of the finest ash, and as light and slim as the strength of the wood permits. The upper tooth should be two feet or a little more in length, and that of the other two, each three inches shorter than the one above it; and all of them curved similarly to the back of the blade of the scythe. The stem of the rake is driven into a socket of iron, but not fastened to it with a nail; the socket has a wedge-shaped toe kneed at right angles to it, in the direction of the teeth of the rake. It is fastened to the sned so as to stand in a perpendicular position when the scythe is to be used, with the same iron ring and wedges which fasten the blade and sned together. The rake stands with the socket about thirteen inches in height, and the spaces between the teeth and the undermost tooth and the blade of the scythe, are about four inches. The adjustment of the scythe consists in placing the blade in such a position as that its point shall be as far from the handle by which the mower supports the scythe in his right hand, as the length of the blade itself, and as this handle is from the butt end of the blade. In short, the butt end, and the point of the blade, and the right-hand handle, stand in the angles of an equalateral triangle, the edge of the blade for reaping, should not be so low set as that of the scythe which gardeners use for cutting grass walks, nor so high as for the cutting of clover. The left-hand handle is placed the distance of the elbow to the extremity of the middle finger of the man who is to use the scythe from the right-hand one. The right-hand handle should be curved and placed on the sned, so as the scythe should be suspended in a working position: both are fastened in the tightest manner to the rings which slide on the sned, by the shank of the rings passing entirely through their length and rivetted. The hone is hooked on with two nails at the upper extremity of the sned; the sned is about seven feet in length, and is shod at the upper extremity with a socket and pike; the pike when inserted into the ground serving to render the scythe steady in the act of whetting. A strong cord is requisite from

the outward rod which strengthens the teeth of the rake to a nail in the sned, a little below the right-hand handle, to serve the double purpose of keeping the rake in the desired position, and of laying the corn over in swath. Thus equipped, the reaping scythe should balance itself exactly on both sides of the right-hand handle.

The relation of these minutiæ will not, we hope, be considered tedious, for upon the proper adjustment of the component parts of a scythe depends in a great measure the success of reaping the corn neatly and quickly. Reaping with the scythe is hard work under any circumstances, but attention to minutiæ relieves it of irksomeness. * *

The best position of the corn for reaping with the scythe, is the upright, or a little swayed, either naturally, or by the wind from the mower. The best direction to reap in respect to the ridges, is across. The ground is then always straight for the stroke of the scythe, and the furrows of the ridges are easily cleared. In commencing to reap a field of corn, a little consideration is requisite. The general position of the corn over the whole field must first be considered, then the quarter from which the wind blows, and, lastly the direction of the ridges. If all are favorable, the work will proceed cheerfully, if not, a compromise must be made with the opponent. The wind must be always in the back or on the right-hand of the mower. A strong wind will sometimes overrule the natural position of the corn. A diagonal direction across the ridges should always be preferred to one along them. At whichever side of the field operations are to commence, that side must be entirely opened up by cutting down a breadth of corn in the line of the ridges, equal to the whole band of mowers. This cleared road-way gives access either across or in a diagonal direction over the ridges.

To carry on the reaping in a regular manner, it is necessary to classify the mowers into bands of two each, according to their ability, that each band may be equally dexterous. Two inexperienced or weak-bodied mowers ought not to be together, as they will assuredly cause a hinderance to the work, at one time or another. Let a steady good mower take the lead of the first band, and let each band keep its leader and people and place of precedence ever after, otherwise confusion of work and wrangling among the mowers will inevitably ensue.

Every band may be arranged in this manner: two scythe-men to reap; a person, generally a woman, to follow each scythe, to make bands and take up the corn, and place it in the bands in bundles ready to be bound up; a bandster, always a man, follows the women, and binds the sheaves; the two bandsters set up the corn together into stooks; a woman follows the whole with a large rake, and clears the ground of any lose corn, and brings the rakings to the bandsters, to be bound up in the sheaves or by themselves.

Some people place three mowers in a band, and in this case there will, of course, be three takers-up and three bandsters, and a man to rake to the three instead of a woman to rake to the two scythes. There is, we believe, a saving of wages by this arrangement, as the wages of women are nearly as high as those of men at harvest-work. But by the former arrangement, we are sure there will be less loss of work and time, in case any accident befal the scythe, and accidents will occasionally happen to scythes in the hands of the most expert mower.* On small farms where three mowers are able to reap the whole crop, the latter arrangement may be beneficially adopted.

Suppose, then, that two mowers and their people form a band, and suppose there are three bands engaged at harvest, they should arrange themselves by these circumstances. Sixty yards is as much space of corn as a scythe can cut easily at one sharpening, and that distance is about as far as most men can cut at a breath. Twelve ridges of five yards each, or ten ridges of six yards, will thus mark the breadth to be cut at once. Let the foremost or leading band start first to the cutting of the sixty yards, whilst the other are preparing to follow; let them then sharpen their scythes, and proceed forward other sixty yards; and while they are doing so, let the middle band commence, and they will cut their sixty yards in the same time in which the foremost band will have cut their second sixty yards: let both bands then sharpen their scythes at the same time. When both are ready to start again, let them continue to cut onwards, each its sixty yards, while the last band commences cutting its first sixty yards, which, when accomplished, all the bands will be in their respective places, which they must continue to occupy till the breadth of ground which they occupy shall have been reaped of its corn along the whole field, provided there is no extraordinary interruption from the peculiar state of the corn. In this manner, the band which occupies the advanced position falls back, and takes up the space which has just been abandoned by the band immediately behind it. No interference can thus take place among the different bands, while the one serves as a check upon the other, both in the marking of the time, and the quantity of corn reaped by each. A band losing time in cutting out its sixty yards, will cause delay by preventing the band in front of it entering its proper ground. A band losing ground, by lessening the width of the stroke of the scythe, will deprive the one before it of its legitimate width of stroke. Should laid corn or a stronger part of the crop interfere with one band more than another, it is requisite that the band before or behind it, should advance or fall back the breadth of one ridge or more if necessary, in order to equalise the time among them.

To ensure good work in reaping with the scythe, it is requisite to preserve a keen edge on the blade, and always keep the heel of the scythe close to the ground. The keen edge is best preserved by a broad "cannel" or chamfer, on the upper edge of the blade, aud narrow one below, and which should be sharpened by always moving the hone or whetstone from the heel to the point, because the cut upon the straw is made by moving the scythe from the point to the heel. Many able mowers cannot preserve a keen edge on their scythes, because they are not aware of the necessi-

* In case of accidents, a hammer, a few stout nails, a spare iron wedge or two, bits of cord, and pieces of old hard shoe-sole leather, should always be ready in the field; and even a rough file, to rub down the point of a scythe, should it break against a neglected stone, till it can be properly adjusted on a grindstone, may prevent a considerable loss of labor.

ty of attending to the difference of the chamfers on the upper and under edges of the blade, and through this ignorance, they move the hone or the whetstone both up and down the blade, thereby counteracting with one stroke the good effects of the previous one. The hone, if kept dry, will always preserve a keen edge on the scythe, with the assistance of the whetstone once or twice a-day. It is great work to cut constantly a width of seven feet and a-half, and from ten inches to one foot in breadth at every stroke. We have often observed a particular man, however, cut eight feet in width and fifteen inches broad at every stroke with apparent ease, and this without any stimulus, and without even knowing that we were watching his labors. He was by no means a powerful man at any, but very dexterous at every kind of field-labor, and he was a striking example of the superiority of science over physical strength. He was desirous of working with a scythe, at least four and a half feet in length.

The rake attached to the scythe requires a position differing with the nature of the crop. When the crop is an average one, it should be placed in a line with the back of the blade of the scythe; when a strong one it should be kept within the blade, and when a thin one it should be projected a little beyond the blade. These necessary changes in the position of the rake for collecting the severed corn in a proper manner, will explain the reason why its stem should not be fastened with a nail into its socket. The momentum acquired by the scythe carries round the dissevered corn, and the cord which stretches from the rake to the sned directs the fall of the corn into the swath. The straws of the corn should be parallel to one another in the swath, and the direction of the swath should be at right angles to the line of motion of the mowers.

The corn from the swath must be carefully placed into the bands, and if any of the straw is by accident disarranged by the scythe, it should be adjusted. The taker-up must also be careful in placing the bundles of corn square upon the bands, so that the sheaves would be balanced when tied. Inattention to this necessary arrangement may not only cause much hinderance to the bandster in its adjustment, but trouble to the person who forks the sheaves into the carts which convey them to the stack-yard. In the act of lifting a sheaf with the fork, the most advantageous hold is obtained of it at the band or tying, and if that is not so placed as to balance the sheaf when lifted, the forker has little command over his object. Each taker-up may make bands to herself from the loose corn as they are required for the bundles; but as this operation would be rather too tedious at that time, it is advisable for the takers-up and the bandsters together to make a sufficient number of bands from the loose corn when the mowers are sharpening their scythes, and lay them down regularly near the side of the standing corn to be next cut, within reach of the foremost taker-up, who can easily hand over every other band to the taker-up behind her. With a good crop the mowers will keep the takers-up and bandsters hard at work, with their best exertions and happiest expedients.

When reaped with the scythe, corn cannot be put into too large sheaves, provided they are not larger than they can be wielded without much difficulty. The largest sheaves of oats reaped with the scythe will, in general, be ready for the stack in eight days. Large sheaves clear a field with few liftings, and they advance the construction of a stack at a rapid pace. We are quite aware that large sheaves of corn reaped with the sickle are very detrimental to the progress of gathering in the fruits of the earth, and, of course, we would not recommend the same practice in regard to them as we can safely do in regard to corn reaped with the scythe.

The bandsters ought to bind the sheaves very tightly, the large sheaves shrinking considerably in the drying. The bottoms of the sheaves should be trimmed of all superfluous straws. The stooks should be set exactly in the direction of north and south. In that position they derive the greatest advantage of sun and air combined, to dry them in the shortest time. Twelve sheaves of oats and barley, and fourteen of wheat, form a stook, with hood-sheaves. In dry weather wheat is seldom hooded. A little space left between the sheaves will greatly facilitate the drying of the stook, by the free admission of air.

The raking process cannot be expeditiously enough performed by a common hay-rake. The head of the corn-rake should be made of fine ash, as light as possible, but strong enough to bear the driving in of a number of iron teeth; and it should be at least five feet in length, and feruled with iron at both ends. The teeth should be seven inches in length, and four inches apart, and so curved at their points as that the weight of the rake may rest upon the curve, with their points free from the ground, when the rake is held in a working position. The points of the teeth should be thin and broad. The shank of the rake may be of light fir, and fully six feet in length. An iron rod passing from the shank on each side to the head, will prevent the latter being twisted out of its position. A short handle, like the left-handle of the scythe, and fastened at a convenient spot on the shank with an iron wedge, will facilitate the passage of the rake over the ground. The principal duty of the raker is to clear the ground passed over by the bandsters, and to bring the rakings quickly up to them. The rakings are most easily got rid of by pushing the rake with both hands backwards, in a nearly horizontal position. The labor of raking depends altogether on the state of the crop. The straw of a good crop adheres together, and of course little of it straggles away to be raked together; but a scanty crop produces abundance of rakings. Barley generally leaves more rakings than any other kind of crop. It is more difficult to rake upon new grass, such as in reaping wheat and barley, than on a clean stubble, as of oats. * * * * *

Although it is impossible to lay over very laid corn in a regular swath with the scythe, the corn can be cut with it fully more perfectly in regard to leaving a neat stubble than with the sickle. In such a case, the taker-up has the most difficult task to perform. Rank grown laid corn, with its supple straw, presents a formidable difficulty to the bandsters in the setting the unwieldy stooks. The additional quantity of straw obtained by reaping with the scythe is very considerable.

All sorts of grain may be reaped with the scythe. Oats make the most perfect work, with the greatest ease to all the laborers. Barley with new

grass is not difficult to cut, but the clammy juice from the barley-straws lubricates the scythe with a viscid coating like varnish, which must be rubbed off frequently with the whetstone. The bandsters have always hard work among barley. Wheat is beautifully laid in swath when mown. The takers-up and bandsters have less labor among wheat than the mowers, who must be powerful men to continue a length of time at the work. Indeed some farmers, who use the scythe pretty extensively in harvest, reap the wheat with the sickle. There is no necessity for this change. Men can reap a strong crop of wheat with the scythe as well as the other kinds of grain, provided they are not kept day after day at it for a length of time. Their physical energies could not withstand the fatigue. But there are modes of equalising this labor, and of course of diminishing the fatigue. For example: When a field of wheat and a field of oats are nearly ready for reaping, it is an excellent arrangement to reap the oats in the dewy mornings before breakfast, or as long as there is any dampness on the corn, and then to go to the wheat, or to the barley if there be little wheat on the farm, during the dry period of the day. By this plan much valuable time can be saved in reaping the whole crop. Oats are not the worse by being reaped in a damp state. It is a remarkable fact, that oats reaped in a damp state with the scythe will be nearly as soon ready for the stack as when reaped dry. Not so with barley. Stooks of oats which are reaped dry, but have afterwards been soaked with rain will be longer of being ready for the stack than oats that have been reaped in a damp state. It is a still more remarkable fact, that damp oats reaped with the scythe will be sooner ready for the stack than would the same oats reaped in a dry state with the sickle. Oats reaped with the scythe will be quite ready for the stack in eight days, whereas oats reaped with the sickle require at least a fortnight; and stooks that have been reaped with the scythe will avert much more rain than those reaped with the sickle. We remember a remarkable instance of this, and have repeatedly witnessed the facts mentioned above. After a quantity of potato-oats had been cut down both by the sickle and the scythe in the same field, an uninterruptedly heavy rain fell for three days. We expected the rain to have soaked through every stook. When they were examined, however, after it fained, the stooks which were reaped with the scythe were only wetted on the outside, and every sheaf was quite dry in the heart; and they were ready for the stack in a short time after; whereas those which had been reaped with the sickle were not only soaked through, but they had all to be loosened out to the sun and wind before they could be stacked a fortnight afterwards.

This difference, strange as it may appear, is not difficult to be accounted for. Corn reaped with the sickle, being gathered firmly in the hand, its straw in the sheaves becomes as it were a bundle of parallel rods; between which the rain easily enters, and passes among them into the half-crushed straw in the heart of the sheaf, where it lodges as if in a sponge, and where little air can penetrate to evaporate moisture. On the contrary, a sheaf reaped with the scythe is always in an open and loose state through which the wind can freely pass; and its outside coating consists not so much of a bundle of parallel rods, as of a kind of network of straw, the several threads of which direct the rain to some projecting piece of bent straw, which serves as a spout to throw off the water from it to another till it reaches the ground. These tricklings of water from point to point we have often observed along the sides of the stooks which were reaped with the scythe, with a curious satisfaction. In other stooks, the dropping of water is almost always confined to the lower ends of the hood sheaves; the side sheaves, from the circumstances already mentioned, and their inclined position, absorbing most of the rain which falls against them.

OPINIONS ON SALT, AND CARBONATE OF SODA, AS MANURES.

The last No. of the British Farmers' Magazine (for May 1834) which we have just received, contains a review of a new pamphlet which has the following title:

"*An Address to the Owners and Occupiers of Land in Great Britain, &c. on the Important Discovery of the Decomposition of Common Salt, for the purposes of Manure; whereby an Acre of Land is prepared for the reception of any crop, at the cost of Ten Shillings only. By Henry Kemp.*"

The substance obtained by the decomposition of common salt is doubtless the carbonate of soda, an alkali having very nearly the same properties with the carbonate of potash, which constitutes the principal value of unleached ashes as manure. There can be no question, but that this substance would be very efficient as manure: if it could be obtained from salt (which is a compound of muriatic acid and soda,) by a process sufficiently cheap—but the author does not disclose the process which he has discovered, and therefore his publication conveys no available instruction on that head. It is therefore, not so much to announce this supposed discovery that we refer to the publication, as to present to our readers the concurrent opinions of the author and his reviewer, of the worthlessness of salt itself as manure—of which such wonderful effects have been reported from time to time. The reviewer says:

"Of the use of salt, in an unprepared state, as a manure, we have always held a most contemptible opinion. True, it is, much has been written in its praise, but we have, hitherto, failed to meet with any person who really thought it worthy of a second trial."

The following quotation from the author exhibits his opinions in this respect:

"My only object in this investigation, respecting the value of *unprepared* salt as a fertilizer, is the elucidation of truth; and, I am sure, no lover of it will find fault with my exposition, though it may induce him to think less favorably of salt than he did before. That there are *many* persons who entertain a good opinion of it for its manuring qualities, I very much doubt; for, I have never conversed or corresponded on the subject with any one who has materially differed from me in this respect. I know many farmers who have submitted it for trial on a variety of crops, and who have expressed their disappointment at the results. It was in consequence of the great dissatisfaction which I experienced, after repeated experiments to ascertain its efficiency, that I was induced to attempt the decomposition of it; and, for the complete success

which attended my efforts I am indebted to the failure of all those hopes I had previously entertained, that salt had only to be applied to the ground, to establish an important character as a great fructifier of it. I beg to repeat, that the idea of decomposing salt for agricultural purposes first suggested itself to my mind, from the disappointment that ensued on using it in its *natural* state. Influenced by a sanguine expectation that great good would attends its use, I commenced trying it, on a great variety of crops, immediately on the duty being removed in 1824. I employed it in quantities of from eight to sixteen bushels, applying it at different seasons of the year, and on soils exhibiting every variety of texture, from a retentive clay, to the lightest sand; and, from the minute attention which I paid to these trials, I can confidently state, that no good effects resulted worth notice, excepting, perhaps, to the potato crops: on these it was thought to have done a *little* good, but certainly nothing of a *striking* character."

COMPARATIVE ESTIMATE OF BUCKWHEAT AND RED CLOVER AS GREEN MANURE—HUSBANDRY OF THE VALLEY OF VIRGINIA.

Rockingham, June 16, 1834.

To the Editor of the Farmers' Register.

In sending to you my second years' subscription for the Farmers' Register, I have annexed some desultory remarks, principally upon the subject of buckwheat as a green manure. I have not observed in any of the communications on this subject, published in the Farmers' Register, that property ascribed to buckwheat, which in my estimation, constitutes its chief value in the improvement of a farm; that is, its tendency to cleanse the land of noxious weeds, blue-grass, briers, &c. Of its value as a green manure, I do *not think highly*. In this respect I differ wholly with your correspondent who in your 8th No. (I believe, for I have not the No. before me) expresses the opinion that an equal amount in value in clover seed, buckwheat and plaster, would at the end of the first year with the buckwheat (two crops being plastered and ploughed in) benefit the land as much or more than the clover would do (manage it as you will) at the end of the second year. I have certainly never made any experiment merely for the purpose of testing the relative merits of buckwheat and red clover, as agents in fertilizing the soil, though I have several times used the former, and all my life (as a farmer I mean) been in the constant use of the latter, with the view both to pasturage and the improvement of the land—and am very decidedly of the opinion, that upon my land at least, (generally a sandy loam) the buckwheat (manage it as you may) cannot impart one-fourth—perhaps not a tythe of the fertility to the soil that the clover would, if properly managed. From the results of my several experiments, I believe, that upon such a soil as mine, (it might perhaps be different in stiff, hard, clay lands,) a piece of land well set in clover, and having a proper dressing of plaster of paris would derive more benefit from the roots and stubble of the clover (when the first crop had been mowed for hay and the seed saved from the second crop) than any quantity of buckwheat straw, that could grow upon and be ploughed under in one season, could impart to it. But whilst I believe that there can be but little comparison between the value as green manure, of buckwheat and red clover, (when it is sown upon lands in a proper state for the reception of the seed) I do not mean to depreciate buckwheat: on the contrary I think it a valuable auxiliary in the improvement of our lands. Judiciously used, it would be an excellent pioneer to the introduction of clover into lands that are too poor, or too foul to produce it without the aid of manure, or some cleansing crop. I have found it valuable in subduing a stubborn blue-grass, and in preparing lands so infested, for wheat. This blue (or as it is sometimes here called wire or iron) grass, frequently dispossesses the clover in parts of our fields the second year that they are in clover, in which case it is frequently extremely difficult so to prepare the land for wheat as to prevent the encroachments of this grass in the spring. I have often seen fields of wheat, sown on a clover lay, almost totally destroyed by it. Last year a small part of the field that I cultivated in corn (say seven or eight acres) had become completely sodded over with it. The field had been in wheat the year before, sown on a clover lay, and this nuisance had sprung up, and diminished the product of the wheat at least fifty per cent. upon this spot where the grass had supplanted the clover the year before. Upon this spot, instead of planting corn, I determined to sow buckwheat, (say a bushel to the acre, about the last of May.) It produced a very heavy crop, which, when in full perfection I had rolled down and ploughed in. The whole field is now in wheat: where the buckwheat grew scarcely a spire of blue-grass appears; whilst in some of the corn lands adjoining, though it had been well cultivated with the plough and hoe, and particularly so where any of this grass appeared, the grass is by no means so completely destroyed. It may perhaps also be proper to remark, that this grassy spot had also been somewhat infested with sassafras bushes. None of them grew with the buckwheat, nor do they yet appear in the wheat. But as this is the only piece of my land that is infested with sassafras, and this the only experiment upon it, I cannot pretend to determine whether they are permanently destroyed or not. From this experiment, and others previously made, I am satisfied that buckwheat is valuable in preparing foul land, for wheat: but all my observations concur in proving (to my mind conclusively) that its capacity of imparting fertility to the soil can scarcely bear any comparison at all with that of red clover.

In the case above stated, the crop of buckwheat was so luxuriant, that several of my neighbors declared it was a pity to plough it down; and yet there is not much superiority in the wheat on this spot over that on the adjoining corn land, while it is decidedly inferior to every other part of the field, which contains about eighty acres. Buckwheat when suffered to stand until it ripens the grain, is a very great exhauster indeed—and the straw, when dry, is of less value for manure than any other vegetable substance that I know of, (hemp shoves only excepted.) When ploughed in as green manure, the land should be well compacted with a heavy roller passed over it more or less frequently, according to the looseness of the soil, otherwise it renders the ground entirely too spongy for wheat, and more especially if clover seed is intended to be sown with the wheat, the roller is almost indispensable. But the growth of the clover seed may be ensured by the use of

the peg roller, (an implement used in Albemarle, and made in the common manner, with strong pegs five or six inches long inserted into the roller with a 1½ or 2 inch auger at intervals of six or eight inches each way.) Upon very light and loose soils this implement is almost invaluable. By its use a gentleman of this county last year succeeded in getting a piece of very light loose sandy bottom remarkably well set, where every previous effort to get it in clover had failed.

The business of farming in this section of the state is very much blended with that of grazing. Almost every farmer is to some extent also a grazier; and hard grazing may, I think, be said to be the bane of our agriculture. With a soil generally admirably adapted to the growth of clover and to the action of plaster, the benefits of the system are in many instances entirely neutralized by the injudicious practice of close grazing. Upon farms in a good state of fertility, grazing may, I think, be carried on to some extent without injury, and indeed consistently with the gradual improvement of the soil. But it is often difficult to resist the temptation of the immediate profit of grazing as many cattle as can possibly be made fat on the land. With a view to this double business, my farm is conducted upon the five field system,—the rotation of crops being—1, wheat on a clover fallow—2, corn after wheat—3, wheat in corn land—4—5, clover. The clover is always plastered the first year after being sown, and the first crop mowed for hay. The seed of the second crop is saved; next year it is grazed in the early part of the season, and in the fall the field is fallowed for wheat. My plan is to plaster all my wheat in corn ground with a bushel to the acre, of a mixture of equal quantities of gypsum and leached ashes, which answers the growth of the clover seed, which is always sown upon my corn land wheat fields. This practice pursued for several years past has satisfied me of the error of the opinion which generally prevails in this section of the state, 'that plastering wheat in the spring retards its ripening, and thereby increases the danger from rust.' On the contrary, I am satisfied that plaster when sown early in the spring, instead of checking, really advances the maturity of the wheat. Plaster here costs us from 12½ to $15 the ton in the stone; and upon any of my land (the river low grounds perhaps excepted) a dressing of a bushel to the acre will always at least double, and upon the thinner parts of the farm, quadruple the product of clover. I have been for some time contemplating very seriously the change of the five for the four field system, and abandoning the habit of purchasing western stock cattle for the purpose of grazing. The four field system will have this very great advantage over the five field—that as the clover will stand but one season, there will be much less blue-grass, and green sward with the clover when it comes to be fallowed, and the land can then be so much more easily ploughed, and so much better prepared for wheat. The consideration which weighs most heavily against the change is, the precariousness of the wheat crop of late, owing to the great multiplication of disasters to which it is subject. Within a few years past we have been visited by a disease hitherto unknown to the farmer in this neighborhood, called the scab—(heads dead either wholly or in part.) Last year our wheat crops were exceedingly promising until this most formidable disease appeared. In some instances the promise of thirty bushels to the acre scarcely realized more than five or six; in others a very heavy crop was scarcely worth the labor of harvesting it. Our barns and farm-yards were rarely so well filled, and our garners never so empty. Estimating my crop by the number of wagon loads in the straw, at the usual yield to the load, and I should have had considerably over 3000 bushels: it thrashed out between 12 and 1300. Some of my neighbors suffered still more. The injury in this neighborhood was almost universal, and almost invariably the most highly improved lands (particularly those on which stable manure had been used) suffered most. The crop is now very promising; but this appalling disease has already made its appearance. Our crops of rye and the most forward wheat suffered severely by the very severe frosts in May. The crop of clover is very far short of the usual product.

S. H. L.

GREENHOUSE PLANTS.

Greenhouse plants are such as are natives of the Canary Islands, New Holland, the Cape of Good Hope, and other countries in the same latitudes, which only require to be protected from the frosts of this country. They are therefore kept under glass during winter, but no fire is requisite, unless a strong frost is expected during the night. In winter they should have plenty of air during fine days, as early in the day as the weather will permit, and the house should be shut up early in the afternoon, if the weather be cold. When the weather continues damp and wet, a little fire is requisite to expel the damp, for greenhouse plants are more likely to be injured by damp than cold. The plants should be looked over every day, to take off any dead leaves, and to water them that are dry. This operation should take place only in the forenoon, and if the surface of the earth in the pots becomes green, it should be removed with a flat stick, but not so deep as to injure the roots, when a little fresh earth should be laid upon them. Towards spring they require a more plentiful supply of air and water, and if no frost be apprehended, some of the sashes should be left a little open all night, so that the air may be gradually admitted as the weather advances towards summer, until the time of setting the plants out of doors. In some seasons this may be requisite about the middle of May, in others not until the end. Calm cloudy weather is the best time for setting them out: the most sheltered situation should be chosen, a bed of ashes being previously prepared for them.

There are various opinions as to the best time of shifting greenhouse plants into fresh pots and mould; we think the earliest spring time should be preferred. Some shift them before they are set out of doors, others when they first set them out; some do this in the autumn, which of all times is the most improper; the pots should always be well drained with shreds. If any of the plants have grown too straggling or tall, they should be cut back early in the spring, that they may become good bushy plants before autumn. In summer while the plants are out of doors, they should be regularly supplied with water in dry weather, as

late as possible in the afternoon. The mould for potting should never be shifted, but chopped up finely with the spade with the turf. This keeps the soil light and loose, it allows the roots of the plants to spread, and the water to penetrate; while, on the other hand, sifted mould hardens and becomes sour. Cuttings of greenhouse plants require putting in at various seasons. If they are to be ripened cuttings, they should be planted early in the spring; but if young, the time to plant them is when the shoots have grown a sufficient length for that purpose. In potting of plants raised for cuttings, care is requisite not to injure the fibres. Put them in small pots first, and increase the size as they grow; but be careful not to put them in too large, or to give them too much water. Sow the seeds early in the spring, place in a little bottom heat, and pot the young plants separately when they have grown an inch high.—*Mr. George Don, on Gardening and Botany.*

IMPROVED RAW SUGAR.

A most decided improvement has taken place in the manufacture of sugar from the cane juice, and some samples introduced into the market have excited the most eager anxiety from all parties interested in this branch of colonial and commercial intercourse. It is pure raw sugar, obtained direct from the sugar cane, without having undergone any subsequent process of decolorization or refining, prepared by effecting the last stages of the concentration of the cane juice in vacuum, at a temperature insufficient to produce any chemical changes in its constituent parts. By this improved and scientific process of manufacture, no molasses or uncrystallizable sugar is formed, and there is hence an increase in the quantity of sugar obtained of 25 per cent. Whilst this establishes the philosophical fact, that molasses are not an *educt* of the cane, but were merely a product of the former operation, from the intense and long continued degree of heat employed in the processes, this saving from the vast quantity of deteriorated material must be considered an object of the very first importance to the planter, in the increased quantity of his production, which is likewise obtained in a very far superior degree of quality and purity; and readily commands a price of £10 to £12 per cwt. additional in the market.

The sugar, thus obtained, is in perfect, pure, transparent, granular crystals, develloping the true crystalline form of the sugar, and being entirely free from the least portion of uncrystallizable sugar or coloring matter. It cannot fail to ensure a preference in the market for all purposes of manufacture, solution, or for domestic economy, as it is a purer sweet than even the best refined, and possesses a rich melifluous taste, not approached by that obtained by any other process, whilst it is not apt to become acescent in solution.

In addition to the great advantages to the planter, in saving from the vast quantity of deteriorated material, and that extensive state of partial decomposition, in which the raw sugar has uniformly been transmitted to our hands, the time and labor of the operation is greatly decreased, the apparatus possesses the power to make double the quantity in the same space of time as the old method; and this is ready for shipment in four days, in lieu of three weeks, as heretofore. In the manufacture of rum, all danger of deterioration in the production of empyremua is avoided, and a far purer spirit is obtained by the use of the molasses, which are separated by this process.

The new process is now in complete and successful operation in eight estates in Demerara. From the results of the first trials, the introduction of the present improved process cannot fail soon to become general; while it is considered by the best practical judges, to open sure and certain means of re-vivifying the spoiled fortunes of the planters, and to be of the most material influence in promoting the future prosperity of our West Indian Colonies.—*Medical and Surgical Journal.*

GOLENOS OAK.

This large tree, which was felled in 1810, grew about four miles from the town of Newport, in Monmouthshire. The main trunk at 10 feet long, produced 450 feet; one limb 355, another 472, a third 235, a fourth 156, a fifth 106, a six 113, and six other limbs of inferior size, averaged 93 feet each, making the whole number 2426 cubic feet of sound and convertible timber. The bark was estimated at six tons; but as some of the heavy body-bark was stolen out of the barge at Newport, the exact weight is not known. Five men were twenty days stripping and cutting down this tree; and a pair of sawyers were five months converting it, without losing a day, Sundays excepted. The money paid for converting only, independently of the expense of carriage, was £82; and the whole produce of the tree, when brought to market, was within a trifle of £600. It was bought standing for £405. The main trunk was 9½ feet in diameter, and in sawing it through, a stone was discovered, six feet from the ground, above a yard in the body of the tree through which the saw cut; the stone was about six inches in diameter, and completely shut in, but round which there was not the least symptom of decay. The rings in its butt were carefully reckoned, and amounted to above 400 in number, a convincing proof that this tree was in an improving state for upwards of 400 years; and as the ends of some of its branches were decayed, and had dropped off, it is presumed it had stood a great number of years after it had attained maturity.—*Time's Telescope, vol.* 3.

D'ARCET'S APPARATUS FOR EXTRACTING GELATINE.

On March 9, at the Royal Institution M. D'Arcet's improved apparatus for extracting gelatine from bones was exhibited, and some of the soup made in the theatre. It is an improvement of Papin's digester. It is a pity that these machines are not more used in England, for we heard that 800,000 rations of soup are made in Paris weekly from bones; and we are informed, that if the bones of an ox were put into the digester, and the whole of the flesh into any other vessels, that the bones would yield one-third more gelatine for soup than the whole of the meat; *i. e.* the proportions of the former would be as three, the latter as two. The fibrine, of course, would be eatable and useful: it is of the soluble matter only that account is here taken. The refuse of the bones, after the gelatine is removed, forms excellent materials for making animal charcoal.—*Medical Gazette.*

ON THE EFFECTS OF GYPSUM NEAR SALT WATER.

To the Editor of the Farmers' Register.

It has frequently been asserted and generally believed, that plaster of Paris, or gypsum, would not answer as a fertilizer of soils situated on salt water, or within the influence of saline atmosphere. From an experiment made by me this spring, with plaster on clover, I am convinced of its *powerful* effect as a manure on soil under the influence of salt water.

On the 5th of March last, I had plaster strewed on alternate lands, ten feet wide, leaving the intermediate lands unplastered. When the gypsum was applied, the clover had sprung, some of it three or four inches high. The plaster was directed to be strewed at the rate of a bushel to the acre, but from the appearance of it on the land immediately after, I thought it was less, and not sufficient in quantity to do any good, even if the soil were congenial to it. I have been however, not only disappointed, but agreeably surprised, by the heavy growth of clover, where the plaster was applied; whereas in the lands not plastered it was indifferent.

From the deep verdant color and high growth of the clover on the lands which had been plastered, contrasted with the unplastered part, the ground had the appearance of having been mowed every other land. These effects were only visible where the soil was well taken in clover. In some portions of the ground, it had been exhausted, or eaten out by other grasses it having been in clover three years. On the other grasses which the soil had spontaneously thrown up, I saw no effect produced by the gypsum.

A neighbor who saw my clover, assures me he never saw so great effect produced by plaster in the county of Frederick, where he resided for some years, and where plaster acts as powerfully as in any part of Virginia.

The land which was the subject of this experiment, is distant about a mile from the Rappahannock, where the water is salt, and on the first range of hills above the river low grounds. It is a fertile clay, well adapted to wheat and corn, and capable of producing good crops of either. It has no appearance of being naturally calcareous, nor have calcareous manures been applied to it. I observed in some part of the land, where stable manure had many years ago, been abundantly applied, and where the clover was very luxuriant, that the difference between the plastered and unplastered lands, was slight; though in these spots there was a difference in the color of the clover. This reminded me of the theory of Sir H. Davy, that probably plaster may be supplied to some soils in sufficient quantities, in manures which contain it. I could upon no other principle account for its want of efficacy in these particular places, than by supposing the soil to have been sufficiently supplied with gypsum, chemically combined with stable manure.

May it not be very questionable as to the effect which saline atmosphere, has upon gypsum? *Has it any?** It is advantageously used in some parts of England very near the sea, as for instance in Kent; whereas it has been found of no service in some situations more remote from the coast. If salt air had the effect of neutralising plaster, would it act any where in Kent? We should say not, when we remember it has been said that the spray of the ocean has been carried in violent storms, fifty miles from the coast.

Though Davy was not a practical agriculturist, yet his opinions in all that belongs to chemistry, directly or indirectly, deserves weight. He says, "the reason why gypsum is not generally efficacious, is *probably* because most cultivated soils contain it in sufficient quantities." He found gypsum in the soils of Norfolk, Middlesex, and Essex. Lord Dundas informed him, that having tried gypsum without any effect on his estates in Yorkshire, he had the soils examined, when it was found in both of them.

It is not my present purpose to examine into the "cui," or "quo modo" of the efficacy of plaster, but to assert the fact of its effect upon my own land on the Rappahannock.

Should the attention of our landholders in this region of country be called to the use of plaster, and if it be found to act as I am persuaded it will, it may be added to the long list of manures within the reach of almost every farmer in this section of country, such as marl, sea grass, &c. which if judiciously and perseveringly used, would render agriculture, *with us*, one of the most certain and profitable pursuits of life. R. W. C.

Richmond county, June 17, 1834.

RICHMOND MILLS.

During the last season 235,250 bushels of wheat where ground at Haxall's Columbian Mills in this city, producing of family and superfine flour and middlings 48,100 bbls. of which 38,000 bbls. superfine branded "Haxall" were sold for the South American markets. This is the largest receipt of wheat in any one season by any miller in this city. The year Haxall's old mill was burnt the receipt at the Gallego mills was 204,000 bushels.

The Columbian Mills have now 14 pair of burrs besides rubbers and 4 pair more are to be added. The new Gallego mills have 20 pair of burrs besides rubbers.—*Richmond Compiler.*

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* Since the above was written I have accidentally turned to your "Essay on Calcareous Manures," where you say page 143—"It is well known that gypsum has " failed entirely, as a manure, on nearly all the land on " which it has been tried in the tide-water district, " and we may learn from various publications, that as " little general success has been met with along the At- " lantic coast as far north as Long Island. To account " for this general failure of a manure, some one offer- " ed a reason which was received without examina- " tion, and which is still considered by many as suffi- " cient, viz. that the influence of salt vapors destroyed " the power of gypsum on and near the sea coast." Who this "*some one*" was, I should like to know; and whether he came to his conclusion by actual experiment or by bold conjecture.

[The opinion referred to by our correspondent, certainly was not founded on experiment, and probably had no better support than "bold conjecture." We believe that it will be found stated (and with approbation) by Mr. Livingston, in the appendix to the article *Agriculture*, in the American edition of the Edinburgh Encyclopædia: but as we have not that volume at hand, it is possible that we may be mistaken.]

EXTRACTS FROM "A FEW DAYS AT HOLKHAM."

By the Rev. HENRY BERRY.

[The following extracts are from a much longer article continued through the last three quarterly numbers of the British Farmers' Magazine. We do not like to begin the publication of any thing until its conclusion has been seen, and a judgement formed of the whole together; and this we are just enabled to do by the arrival of our last foreign periodicals. The report is much less interesting than we should have anticipated from such a subject, treated by so competent a writer as the Rev. Henry Berry, who is now conductor of the Farmer's Magazine. Still, it cannot fail to please most readers to hear the latest account, however imperfect, of the operations of the farmer who perhaps truly deserves the title of the greatest and best, and who is one of the most eminent living benefactors of the human race. His immense estate, now one of the most fertile and profitable in the world, was once but little better than a barren waste. All its fertility, beauty and value, have been created by the skill and labors of Mr. Coke. If there is any greater service which he could have rendered for his country, and for the world, or if there ought to be more glory attached to the name of any living man, we at least have no conception of either.]

From the British Farmers' Magazine.

* * * * * We proceeded without further delay to Holkham, where we arrived about midday. I had never heard, and of course had no conception of Mr. Coke's active habits. He rode up to the house immediately after our arrival, and at the same time ordered luncheon and the carriage, and in less than half an hour we were on our way to view, in the first place, his Devon cattle. It may be proper here to say something of the land on which these cattle are depastured, and though much has already appeared before the public on the same subject, from more able pens than mine, the interest attaching to every thing at Holkham, and more particularly the necessity I am under of noticing the quality of the land, will excuse what may appear, to some persons, an unnecessary repetition. Mr. Coke's estate, around Holkham, consists principally of a hungry sandy loam, or light gravel of the same character, with occasional, but not frequent, interruptions of small patches of bog. The latter description of soil was, during the early part of Mr. Coke's proprietorship, covered with low alder bushes and sedges, which seldom failed to hold a fox. They are now, by his skilful application of capital, rendered highly productive water-meadow. The instances of this kind are however few, and not of any great extent where they do occur. But in every possible case, advantage has been taken of circumstances, and the profitless bog has been converted into water-meadow of the highest quality. With respect to the arable land, and the permanent pasture, which principally owes its existence to the system of innoculation,* the nature of the soil, and the extent of its amelioration, may best be judged of from the following facts. An estate let, when Mr. Coke first came to Holkham, at one shilling and sixpence per acre, and subsequently on a lease at three shillings, was, at the end of his term, quitted by the tenant in consequence of his considering he could not pay a rent of five shillings per acre. The estate was tithe-free!—Now, mark the difference in the performances of two men, and let all despondency cease as to the capabilities of our poor soils to produce food, and profitably to produce it, under an equitable and judicious protection. From this identical estate, Mr. Coke, under his superior management, obtained seventy-nine bushels of barley, per acre! Again, on the same land, and on land of similar quality, his crop of wheat of 1832, from 306 acres, produced 2632 coombs; being an average of rather more than thirty-four bushels per acre. This was obtained from land decidedly not wheat land; but it shows what cultivation will achieve. I shall not at present go into any detail of Mr. Coke's management of his wheat crop, the remarks which have preceded, being preliminary to a notice of his Devon cattle, it being evident that on such land, howsoever well the permanent pastures may have been managed, not only drought, as in the present season, but also many other causes must conspire to render the bite for cattle too frequently scanty; and, consequently, to render much circumspection necessary in the adoption of a breed. It is now about forty-two years since Mr. Coke, very properly considering the difficulties he had to encounter on his light poor soil, began to breed Devon cattle, and it is not a little creditable to his judgement that he has, during that period, scarcely referred to any thing which may, properly speaking, be called a cross; certainly, to none of which he could permanently avail himself, and yet his Devons, take them altogether, are by far the best I have ever seen. I much doubt whether the county of Devon can produce such an animal as one of Mr. Coke's bulls, the sire of the ox which embellishes this number of the Magazine. I am totally free from prejudice on these matters, and, therefore, candidly admit the ox in question to have been, in my judgement, at the time I saw him, the most *complete* I ever put my hand on. I am sorry to say Mr. Coke's indulgence of his neighbors' wishes consigns this ox to slaughter at home. Such an animal ought to appear at Smithfield. He has, however, others coming forward, of high promise, and I trust he will gratify the Smithfield club, on the first possible occasion, with a specimen. The dairy of Devon cows appears to be, and I am assured is, highly productive, each cow, no matter what her other excellencies, being rejected which proves a bad milker. They present great uniformity of character, with all the genuine distinctions of the pure north Devon cattle, and, with great aptitude to fatten, possess precisely the compact bodies and short legs, which constitute the *multum in parvo* I have so often advocated. Much as I admire the Norfolk husbandry—much as I have seen to admire in the zeal of Mr. Coke's tenantry to evince their gratitude and respect, there are two things which I must severally censure and deplore. While the judicious and spirited improvements in tillage of this great landed proprietor have been forcing conviction, and obtaining adoption, his efforts as to the stock of the country have been comparatively vain, and he stands alone, a solitary in-

* Innoculation of grass land is setting out bits of old turf of the grasses desired, at such distance as will permit the plants to spread and cover the whole surface.—ED. FARM. REG.

stance of a man who for forty-two years has produced proof, and invited investigation into the merits of his Devons,—has offered and committed costly sacrifices to carry his useful object, without, except in few instances, being able to induce his tenantry to adopt a profitable breed of cattle, for an unprofitable one—a system of economy devoted to the most useful end, in lieu of a system of extravagance, purchasing its advantages at a rate beyond all chance of remuneration. With, as I said before, few exceptions, the miserable and unthrifty home-breds are the cattle kept, but, generally speaking, little or no regular stock of cattle is maintained, and during the present year, in the month of September, short-horns (so called) and every wretched specimen conceivable of all that is bad, were consuming oil-cake in the yards, for the purpose of converting the straw to manure. On this subject Mr. Coke feels, and well he may, much disappointment, but it is not confined,—this blindness to their true interests—to the article of cattle alone. In sheep it is the same, and prepared as I am to show, hereafter, that no breed in the island now equals, in profit, that of Holkham, I shall only here observe, that so far behind the rest of the world are the majority of Norfolk men, on the subject of stock, that they appear to select with a view to obtaining those qualities which well informed men would pronounce bad, and invariably reject. Be it remembered, I have qualified this censure with a reservation,—and it will be my agreeable business hereafter to register some honorable exceptions. While our ideas were yet employed in reflections on the beautiful oxen we had just inspected, Mr. Coke rather mischievously contrived we should arrive at a tenant's farm, where a considerable number of short-horned steers were acting the part of very unthrifty machinery for the reduction of oil-cake, in combination with straw, to manure. The laugh, of course, was against me, and was not diminished by Mr. Hillyard's silently, but expressively, appealing to a brick wall, as the fittest representative of the quality of the flesh of these animals. I was reminded, on this occasion, of the appeal of the "Lancashire Farmer" to Mr. Coke's authority, as condemnatory of short-horns, but he instantly explained to me, as I well knew beforehand he had meant, that it was such as the short-horns then before us, Lincolns, or, indeed, any thing (for they were a mixture of all) that he condemned, and that he had not *improved short-horns* in view at all. I was authorized to make this statement, and consider it ought not to be omitted. It was early an object with Mr. Coke, to induce his tenantry to adopt the Devons, but he succeeded in a few instances only. In one of these he requested his tenant's wife to accept four Devon heifers, as a present, and to give them a fair trial against the home-breds. The cattle were accepted, and the trial made, and it can scarcely be necessary to add the produce for the dairy was of very superior quality, while the advantage in respect to carcass, was still more conspicuously evident. This tenant then became a breeder of Devons, and I saw on his farm some beautiful and most useful cows, but I am sorry to add an account of his inexplicable conduct as to this stock. He was disposing of his Devons, without any apparent motive, and substituting for his oxen of that breed, some shapeless unthrifty beasts, of immense bone, and, apparently, the produce of a cross between a bad Scot, and a worse Norfolk home-bred. But Mr. Coke has not confined his efforts to the dissemination of his Devons among his superior tenantry. The smallest holders, as well as the cottagers, have an opportunity kindly afforded them, provided they possess also the will, to obtain a superior sort of animal to that of the county. A number of in-calf heifers are annually draughted, and allowed to the purchasers at £12, £3 being returned by Mr. Coke, if the purchaser choose, for the calf, whatsoever its sex, and should one of these heifers, or all of them, prove bad milkers, they are replaced by others. Thus instead of being imposed on by a jobber at a fair, each small holder has a good dairy cow *certain*, and in proportion as they are disseminated, the country benefits in its breed of cattle. It is not foreign to the subject of these small holders, to observe, respecting them that they are generally Mr. Coke's laborers, who have been put forward by a judicious promotion, which follows a career of sober industry. I witnessed the announcement of his advance to what would be a provision for his declining years, to one of the workmen, who was engaged superintending some ploughs at work. Need I add the announcement was well received, but evidently excited no surprise, and appeared to be considered as the result of a compact, well and tacitly understood between the employer and the employed, the benefactor and the meritorious. I do not consider that Mr. Coke could with propriety keep any other cattle, as a breeding and dairy stock, at Holkham. The stock next in fitness would be the Scots, but the Devons mature earlier, and, I think, judging from his specimens, they will pay a good deal more money. Of his own north Devon oxen he works none, but he has at plough twenty pair of south Devons, somewhat larger, coarser, and showing less purity of blood. They are, however, admirable workers, very active and docile, and in conjunction with the advantages of saving horse labor, while also they continue growing, possess a disposition to fatten quite sufficient to indemnify those who employ and feed them, in an ample manner. I am well convinced, from seeing the stock at Holkham, from hearing Mr. Coke's sentiments, and from every circumstance I meet with, at all bearing on the subject, that with the Devons, as well as the larger breeds, it is folly to attempt to increase size—that there is only one best model for all—and that is, the frame combining great substance, well compacted together, with deep ribs, and short legs. It remains to observe, with respect to the Holkham Devons, that their pastures had, in common with all in the county, suffered much from the drought, but notwithstanding this, and that they had only a sheep-bite when I saw them, the cows were, most of them, fat and healthy, and exhibited, in a striking degree, their fitness to fight their way under the difficulties attending a light thin soil, and short bite of grass.

Among the tenants, whose stock I inspected, it would be wrong to omit mention of Mr. Blomfield, who has a superior herd of Devons, and to whom the country is indebted for the hints which led to the transplantation of turf, for the purpose of laying down land to permanent pasture, at Holkham. This gentleman's cows were particularly good in the fore-quarters, and appeared to give a great deal of milk. They have been bred a good while very

closely, and one or two defects were, in consequence, becoming prominent and general. Mr. Blomfield appeared to be fully sensible of this, and to admit the necessity of a cross. He informed me his cows would average an ounce of butter to a pint of milk, and that experience had convinced him, he could graze, and keep in high condition, four Devon cows, on the same quantity of land as would support three home-breds, or Norfolk cattle, in indifferent condition. Strange, that, with facts such as this before them, and stated on the authority of so respectable a man, and able a farmer as Mr. Blomfield, the Norfolk tenantry should not at once, and for ever, banish the home-breds.

With regard to stock, the grand feature, and one that every day assumes, and will continue to assume, additional importance, is the improvement of the Southdown flock at Holkham. When Mr. Coke first came to the estate, the long-legged, misshapen, unsightly, and unthrifty Norfolk breed, had possession of the country, keeping alive an active struggle with the rabbits, for the scanty herbage, a struggle which their length of limb and great speed well fitted them to maintain.

* * * * * Very shortly after this, the Southdowns were seen in possession of the inclosures at Holkham, and long continued to bask in the rays of public approbation, and to evince properties well deserving it. But they did not, under succeeding circumstances, satisfy the enterprising mind of their breeder. One of those fluctuations which are perpetually occurring in manufactures, as in every thing else, demanded a different description of wool, and the question was how to obtain it? Other circumstances also forced themselves on attention. The Southdowns, like the Leicesters, and all improved breeds of sheep and cattle, under similar circumstances, began to run to fat, and to want, in both fat and lean condition, *lean meat*. The *legs of mutton* were becoming abridged of their fair proportions; delicacy of constitution threatened a dangerous inroad; lambs fell weakly, and often perished; and the ewes were becoming worse nurses to those that survived. How long Mr. Coke may have pondered the matter before he ventured on the experiment, I am unable to say, but he resorted to the Hampshire sheep for a cross, with the most brilliant results. This experiment I consider the boldest ever entered on by a breeder, and, I think, any one will agree with me who sees the Hampshire sheep. Let the character of the experiment, however, be what it may, its success is not equivocal. Mr. Coke has lost nothing of early maturity, and has gained in the constitution of his flock. His lambs are dropped stronger, stand the cold better, and are better nursed. He has wonderfully increased the lean meat, and, in particular, enlarged the leg of mutton; while, to crown all, I was assured by Mr. Waller, whose authority will not be questioned, that the Holkham wool is, at the present moment, the most valuable in the island. His shearlings of this improved flock, sold last year at sixteen to eighteen months old, averaged, wool and carcass, £2. 10s. each!

I have frequently had occasion to remark, that few errors prevail to a greater extent, and with more injurious effect, as regards the progress of the science of breeding, than that of adopting one and the same standard, whereby to judge of animals of different breeds, at various periods of their age and growth. I admit, and indeed, have always contended, that there exists one model, which may be safely adopted for all, but this model may be perfected by a number of varying particulars, in different individual breeds. Perhaps I may be better understood by stating the opinion that certain constituent parts may produce a *whole* in one animal, similar to the result derived from very different constituents in another, and as it is to the whole—to the result—we are finally to look, regarding constituents only as indicative of it, I cannot but consider the common practice of judging one breed according to its correspondence with another breed, as a common error. A breeder of Leicester sheep, for instance, will condemn the Southdowns because they are not like Leicesters; whereas he ought either to judge Southdowns by comparison with Southdowns, or, if he will institute a foreign comparison, it should be at the last moment only, when both are made up for the butcher: he will then find they have attained the same object—utility—by different means, and though, compared together at earlier periods, they would have evinced striking differences of formation, yet the process of feeding has developed two carcasses very much alike, and each exhibiting a profitable whole. Thus, also, a breeder of Hereford cattle passes, generally speaking, a sweeping condemnation of improved short-horns, because they are not like Herefords;—he forgets, or, perhaps, has never reflected, that for short-horns to resemble Herefords, or Herefords short-horns, during the period of their growth, or at any time but when made up for slaughter, would be to indicate degeneracy. They arrive at the same finished and profitable state, after a periodical exhibition of different characteristics. To render this still more obvious, I will repeat the objections I have heard made to good short-horns, by men whose general information would lead to the expectation that, even on this occasion, they would penetrate beyond the surface in pursuit of truth, with eyes undimmed by the mists of prejudice. I will suppose myself exhibiting half a dozen yearlings to such a person; I should be favored, as I have been a hundred times, with remarks similar to the following: "They are very good *of the sort;* but the bone is too large—the frame not neat enough—the quality of the flesh too loose, and the hide too thin." Such objections are urged by men who annually visit Smithfield, and see the same sort of animals thus censured beating the Herefords at that time when only comparison ought to be instituted. But what are the sentiments of an unbiassed looker on, placed in similar circumstances? He remarks, at once, "an animal so much larger in frame as the short-horn, must necessarily have more bone, and, probably, less neatness; indeed, if reduced to the Hereford degree of neatness, constitutional degeneracy, and utter worthlessness, would be unavoidably implied. Again, with respect to a less firm quality of flesh in an unfed state, every one acquainted with the subject knows that the early maturity, so conspicuous in the improved short-horns, would be incompatible with any other quality of flesh and hide, for there can be no doubt the later maturity of the Herefords is owing to the unyielding nature of their hide and flesh. A beast, therefore, which is to come into the market, matured a year earlier than his opponent, may well be allowed those qualities on which his quicker growth and

maturity depend, and as he is known when fed to want none of the requisite firmness of flesh, it is at that period only when the two breeds ought to be compared."

I have been led into the foregoing remarks and statement, by a consideration of the steps pursued by Mr. Coke in the progress of the improvement effected in his sheep, and by the reflections which presented themselves during an endeavor to ascertain the principles which actuated him, for though he would readily have gone most fully into any particulars I might have requested, on this, as well as on any other occurrence of interest, it has always appeared to me a not unprofitable exercise of the mind, to attempt an investigation of the views of those whose endeavors have been crowned with success.

It is very evident, on the inspection of the Holkham flock, that Mr. Coke knew how to draw admirable results from, what would appear to many, very unpromising particulars, and that the want of resemblance in the Hampshire sheep to the more correct models presented by the Leicesters and Southdowns, by no means dismayed him. He did not act upon the principle I have been censuring, and abstain from the cross with Hampshire sheep, because they were unlike his Southdowns, or because they were not in themselves what he considered sheep ought to be, but he adopted them for a cross under the assurance that they could furnish what he wanted, and relied on his own skill to obviate the inconveniences which might arise from that proceeding. In this ability to foresee, in what the majority of observers would consider unpromising combinations, a great future excellence, and, on the other hand, to detect those cases in which particular combinations will be productive of disastrous results, consists the superiority of a breeder over his competitors. Persons of less skill may, indeed, for a time go on successfully, with a good stock, but, without this tact, they will fail to *originate* any essential improvement, otherwise than by chance. Nothing can, in the first instance, be imagined more unpromising than the Hampshire sheep, and, indeed, the produce of the first cross with the Southdown is any thing but attractive to the eye. But under the investigation of the hand, qualities become apparent which the eye failed to discover, and it is evident, materials are presented wherewith a skilful breeder, returning again to the pure Southdown, may produce those results, to obtain which the cross was instituted. Under these circumstances, and personally directing every selection, Mr. Coke has produced a flock, differing from pure Southdowns only in these particulars, viz.—in the possession of more *useful* frame (a description comprehending much that is highly important)—a superior quality and quantity of wool—and a greater quantity of mutton, particularly distinguished for a sufficiency of lean meat, per acre, and he has not, in the least, sacrificed the early maturity of the Southdowns. Many persons may doubt the last mentioned fact, on plausible theoretical grounds, but in this case the great access of constitutional stamina resulting from the cross has more than atoned for any loss of the maturing quality, which might, under other circumstances, have been experienced. Practical men will immediately recognize the particulars in which the last mentioned advantages would be realized.

It is impossible for me, myself a breeder, and an advocate for crossing, under circumstances I have frequently stated, to dismiss this part of my subject without expressing a conviction, that independently of all the advantages which result to the public from the adoption and perfection of this judicious cross, we are no less indebted to Mr. Coke for the example* he has set us, of successfully breaking through one of the trammels by which breeders suffer their exertions to be paralyzed, and, too frequently, their stocks ruined. All things equal, except purity of blood, I should assuredly give the preference to a pure stock, but if such a stock be evidently rapidly tending towards that state, in which nothing will remain but its purity to recommend it, why should we suffer ourselves to be fettered by idle, and not merely useless, but mischievous distinctions, acting as if the word *pure* (to which, by the bye, but few stocks can lay claim,) possessed a talismanic power, not only to shield them from deterioration, but to promote their improvement? To some persons all this may sound strangely, coming from a breeder of pure improved short-horns, but a fair interpretation of my humble labors in the field of agriculture, will acquit me of ever aiming to promote any thing which appeared otherwise than useful, according to the best of my judgement.

As in the case of the Devon cattle, Mr. Coke's improvement on his flock of sheep is insufficiently valued among his tenantry, but from what I saw and heard, I doubt not his rams will soon be generally resorted to. Among the Holkham tenantry to whom I was kindly introduced at their own houses, was Mr. Kendle, on whose farm Kippen Ash Fair is held. This gentleman informed me he was using the improved rams, and confidently relied on realising the advantages I have enumerated. He particularly considered he should gain in weight of mutton, per acre, as up to that period he had stocked his sheep as closely as formerly. But the most important fact, resulting from his adopting the improved rams, Mr. Kendle considered to be, that the lambs being dropped rougher and hardier than those of the pure Southdown, he considered himself a gainer, in consequence, to the amount of fifteen or twenty in a hundred! Add to the foregoing, that he was making a considerable addition to his flock of ewes, in consequence of finding he can now turn off his sheep as yearlings. These facts were well authenticated and known, and yet at the fair before mentioned, where upwards of 20,000 sheep were penned, the long-legged Norfolk sheep only were in demand, and I was assured that, as sheep, nothing much worse could be imagined—a fact easily credited from the specimens which came under my notice in different parts of the county. On this subject a singular fact came out in conversation with Mr. Kendle. He informed me the jobbers would not give so much, by seven shillings each, for his superior sheep as for the wretched Norfolks. To these middle men I ascribe, in great measure, the infat-

* With respect to sheep in particular, this example is of the utmost importance, for it is probable that convenience or fashion will frequently call on the breeder to vary the staple of his wool, and immense losses have been sustained while breeders have hesitated whether they should follow fashion, or wait for its re-adoption of the article they produce.

uation which prevails on this subject. They can more readily provide for the demand of the article they deal in from the widely-spread Norfolk sheep, than from the pure or improved Downs, in comparatively few hands. It is therefore manifestly their interest to encourage prejudice, and keep down the price of the two latter, and especially not to afford customers any opportunity of comparing them, as to their progress in feeding, with the much slower Norfolk. Any intelligence on this subject would create a demand they would find very embarrassing. Thus a majority of the Norfolk farmers, practising the best system of tillage in England, allow themselves to be gulled and cheated out of a very considerable proportion of the profit derivable from their superior turnip management. But it is some consolation to believe, that time, which dissipates other infatuations, will, in the end, prove fatal to this also. I offer no apology for the freedom of these remarks: I will never withhold the humble meed of approbation from any practice which appears worthy of it, neither shall I omit to censure a proceeding injurious to the country, and, to the parties adopting it, most particularly hurtful.

I shall close my somewhat lengthy remarks on the Holkham sheep by a brief statement which bears on the question, as to the comparative value of their fleeces. A lot of pure Southdowns, purchased to be fatted for the use of the house, cut one pound and a quarter, each less wool, and of inferior quality, than sheep of the same age of the improved stock.

* * * * * I have already had occasion to allude to the difficulty of observing a connected and regular line of narrative, where circumstances tempt so strongly to digression, and must, once for all again, solicit the reader's forbearance on this account, while I carry him back with me to Mr. Garwood's farm. I understood that this was one of the worst of Mr. Coke's estates, and assuredly nothing can present a more decided proof of the wonders to be performed under most discouraging circumstances, by the skill and enterprize which have been at work in every direction around Holkham. On this estate, of one thousand acres, there existed, some years ago, a bog of fifty acres, from which peat fuel was dug, and the nature of which may be understood from the fact, that an unfortunate man, attempting to cross, was suffocated in it. What was bog, profitless, except for fuel, is now a fine water meadow, which, the occupier informed me, he valued *along with the farm*, at three pounds per acre. In the late dry summer, being enabled to water it, he informed me the produce was almost incredible—at all events he kept on the fifty acres the following stock, viz. more than ten sheep per acre, twenty bullocks, from four to six years old, and ten horses.* Early in his occupation of this farm, Mr. Garwood had a predilection for the Norfolk home-bred cattle, of which he selected and bred some of the best. Being, however, superior to prejudice, he was induced to go into Devonshire, and purchase the cattle of that county. Having tried both, he came to the conclusion, that, in point of profit, the home-breds are far inferior, and, as might be expected, much greater consumers of food. An examination of his books gave an average of four pounds of butter, per week, for each Devon cow.

Among the numerous visits paid to the tenantry of Holkham, highly as all gratified me, certainly, that which introduced me to Mr. Pettingal, and his farm, proved the most agreeable; a fact to be ascribed to the circumstance that Mr. Pettingal, having only very recently entered on his occupation of an estate in want of improvement, I had the opportunity afforded me of observing how much may be done, and how rapidly, under the influence of a good understanding and perfect confidence existing between a landlord and his tenantry. It may be proper to mention in this place, that Mr. Coke values his own estates, and the best commentary on the manner in which he acquits himself is furnished by the fact, that no dispute has ever arisen, during any of these transactions, to drive a tenant from an estate, who felt any desire to remain on it. If a difference of opinion has occured on the question of value, it has been overcome, on the one hand, by considerate and liberal concession, on the other, by implicit confidence. I would not be understood by the foregoing remarks, or by what may follow, to recommend gentlemen, generally, to take this nice and difficult affair into their own hands; such a recommendation would be absurd on every account, and little likely to obtain attention, for nothing but confusion and mischief would follow an assumption of that for which the parties are generally totally disqualified. My sole object is to show what an early devotion of time and ability, to a subject of infinite importance to country gentlemen, may achieve under favorable circumstances, when I assert that the cost of agency on this princely and highly managed property is considerably less than that on any other in the kingdom of, perhaps, half its extent and value. But such is Mr. Coke's systematic arrangement that every difficulty vanishes before it.

When Mr. Pettingal applied for his farm, Mr. Coke's idea of its value was stated to him, and it was fairly submitted, that a great outlay would be requisite to insure a profitable taking. He closed with the offer at once, expressing himself much pleased to have the farm, one of seven hundred and eighty acres, and concluded with these remarkable words, "Sir, I cannot put my money into so good a bank as your land." I believe he had, at the time when I saw him, occupied the estate about two years, during which period neither landlord nor tenant had been idle. A beautiful house, replete with every convenience, had risen, and Mr. Pettingal, on taking us through it, pointed out with marks of genuine satisfaction, the arrangements which had been made to provide for every comfort of his family. On the other hand, Mr. Coke's pleasure and approval of what his tenant had done, with a feeling corresponding to that of his landlord, were as ardently and unequivocally expressed. This enterprising tenant had, at the time I mention, completed very little short of one hundred miles of drains, with tiles drawn from a great distance, from the Holkham kilns. It is but justice to both parties to add, that the tenant up to this period had never asked for his lease, "but," remarked Mr. Coke, "I have made him safe, lest any accident should befal me."

*Is it not singular, that, within about ten miles of Holkham, and within the reach of almost every day experience of the value of meadow thus circumstanced, I should see a considerable tract of land inviting irrigation, a brook running along side and above it, but tempting the sluggard in vain?

The extensive and substantial outbuildings which were erecting on this farm, naturally introduced the subject of the Holkham plantations, for the massive and beautiful beams used in the progress of the work were the produce of silver fir trees planted eight years after Mr. Coke came to Holkham, an event which took place in 1776. Thus we find trees of forty-nine years' growth producing beams of substance and strength ample enough for the largest agricultural buildings. But it was not in a solitary instance, that of the silver fir only, that the propriety of devoting the attention of early life to planting was manifested; the floorings also were composed of beautiful oak timber, likewise the production of plantations of Mr. Coke's own making. There is something really rare and wonderful in thus beholding a man gazing as it were upon a creation of his own, and if any circumstance in this world is calculated to make us bitterly acknowledge and lament the mispent days and neglected opportunities, never to be recalled, it is something similar to what I witnessed on this occasion.

Mr. Coke was kind enough to take me, after service on Sunday evening, upon the tower of Holkham Church, the elevation of which is admirably calculated to display to advantage the tastefully disposed and thriving plantations of the park and surrounding farms. We had driven a good deal through the plantations and marked their healthful state, and the bird's eye view of the whole, obtained from the church tower, was the best imaginable finish. The soil about Holkham presents little attractive to the planter, but in this respect as in every thing else, difficulties and discouragements have been disregarded and overcome. The plantations are admirably managed, particularly with respect to pruning, an account of which, as applied to forest trees, has already appeared in this work. There is, however, one part of the practice here which I presume is little known, because seldom carried into effect elsewhere, and yet it is of the first importance to the owners of the extensive tracts of copsewood, which prevail in some parts of the island. The general practice in falling coppice is to cut downwards, by which means the stump is rather shattered than cut, and, consequently, the rain is admitted,—rottenness follows,—and the period of the ensuing fall is considerably protracted. The Holkham method is to cut upwards. The division is thus effected perfectly clean, without shattering, and it may be fairly calculated that the coppice is ready to fall again two years sooner than under the influence of the ordinary mode of operation.

The average annual value of the thinnings of Mr. Coke's plantations is three hundred pounds! These thinnings leave no apparent gaps, and are rendered requisite by the rapid growth of the trees intended to constitute useful and ornamental timber. The silver fir is, deservedly, a great favorite in these plantations, and among a number of beautiful specimens of the kind, which attracted my attention, I took the girth of one in particular, which proved to be six feet ten inches. The value of the tree at the then price of timber was nine pounds! A pretty ample return made to a planter, during his lifetime, for the exertion of inserting a diminutive sapling in a sandy waste!

But it is not in his regular plantations alone, that Mr. Coke has manifested the capabilities of his country. He has seized and rendered available to his one great object, circumstances such as certainly never occurred, as matters of promise, to other men. I rode with him through a beautiful wood, the extent of which was one hundred and five acres, closely planted with oak trees of spontaneous growth. Originally, these trees could boast only a few old stunted oak pollards, and the rental of the ground was five pounds. Fifty years ago Mr. Coke inclosed it, leaving the pollards to do the rest, and from their annual deposit of acorns has risen the present wood, which pays him a rental of six hundred pounds!

About five miles from the house, and at the entrance from London, a very thriving plantation is now rapidly proceeding to ornament, on each side, two miles of the road. The trees have been planted on a very barren unpromising shingle, and the attempt, perfectly successful, was the suggestion of Mr. Blakie, who acted for some years as Mr. Coke's agent. Mr. Coke, with a kindliness of feeling highly honorable to him, and at the same time complimentary to his agent, has named this "The Blakie Entrance."

I ought not to omit stating, that the fall of fir timber always takes place, at Holkham, during summer, when the wood is in that state, as to its turpentine, which tends most to its preservation.

In connexion with the plantations, it is impossible to overlook their numerous tenantry, the game. Were I to attempt to describe the numbers in which hares, pheasants, and partridges swarmed in every direction, and wherever we turned our heads, I should be suspected of exaggeration. But I wondered not so much at their numbers, as at the circumstance of any thing like a crop of grain escaping them; yet, such is the case, as the high averages of the different crops show. I believe this to be attributable to the cause assigned, viz. the thickness of the sowing and of the crops. So thick are they, that the game cannot with comfort get into them; and I have invaribly observed, that, while any moisture remains on the growing corn, birds, unless driven, are averse to enter it. They have also a great dislike to any cover from which they cannot at once rise without entanglement. I know not how others may be reconciled to the reasons here assigned, but the fact that the game is abundant almost beyond belief, and yet does little mischief, is notorious.

* * * * * In the park I met with a, to me new description of game, in the numerous flocks of wild turkeys which frequently presented themselves. They were splendid birds, and, I am informed, a great delicacy, under proper management, on the table. Their flights during the shooting season, when they become alarmed, are of great length. It is singular that they do not meddle with the corn.

The system of cultivation at Holkham may be described as that which has since been adopted, more or less, by the best agriculturists, on soil of similar quality. The difference consists in the superiority of its application here. If, however, there is one part of Mr. Coke's practice which is more strikingly superior than another, it is his management of a naturally bad soil for wheat. This crop is grown on a clover ley, manured with rape dust drilled into the soil. The wheat is afterwards drilled at intervals of nine inches across the rows of rape, as it is considered that immediate contact with that

manure is undesirable. One drill completes eight acres per day, and the quantity of seed, per acre, varies from three and a half to four and a half bushels, according to the state of the land, and the season. Mr. Coke's tenant, Mr. Blomfield, has even sown so much as five bushels per acre, with the best results, and an experiment was stated to me, in which much more than the rental of any land was obtained by thicker sowing. A material, indeed on this light sandy soil, an essential, part of the management, is the rolling, which is effectually performed by heavy iron rollers. To those persons, occupiers of sandy soil, who consider the cultivation of wheat may not be successfully attempted on their farms, the following statement respecting the wheat crop of 1832 may be instructive and useful. Mr. Coke kindly permitted me to extract it from the farming accounts:—

306 acres produced 2632 coombs of wheat.—Average per acre a fraction over 34 bushels, disposed of as follows, viz.:—

Sold	£2273	3	0
Seed	329	2	0
Poor at Christmas	7	0	0
Inferior tail to pigs, poultry, &c.	21	3	0
	£2632	8	0

It is not to Holkham alone that Mr. Coke has confined his attention, or limited his creative power. The reference which he permitted me to make to his books and statements of accounts, presented many similar instances of successful enterprise in other places. From among these I was particularly tempted to select that afforded by Elmham Park. In the year 1817 he commenced improving this property, by means of draining, clearing ditches, and top-dressing with the soil taken from them. In these labors a sum of £510. 15s. was expended, by means of which the annual value of the estate had increased from 1817 to 1827 to the amount of £500, and a progressive increase of value has, since the last-named year, regularly continued.

ON THE CURING OF CLOVER.

The common method of curing clover is bad. The object to be attained is, to cure it in the *cheapest* and best manner. The common practice of spreading clover from the swath, causes the leaves and blossoms to dry and crumble, ere the haulm or stalks are sufficiently cured. Thus either the finer parts of the hay are lost, or the crop is housed with so much moisture, as to cause it to heat, and often to spoil. Clover should only be spread when it has become wet in the swath and should be gathered again before the leaves dry and crumble. Both these evils may be avoided, and labor saved withal, by curing the grass wholly in the swath and cock. After experiencing the serious disadvantages of the old method, I adopted the one I am about to recommend, and have pursued it satisfactorily ten or a dozen years. My practice has been to leave the clover to wilt in the swath, and when partially dried, either to turn the swaths, or to make grass cocks the same day, so as to secure the dried portions from the dew. That which is not put into cocks the first day, is thus secured the second day, or as soon as it becomes partially dried. These grass cocks are permitted to stand one, two, or three days, according as the weather is, and as the curing process has progressed, when they are opened at nine or ten o'clock on a fair day, the hay turned over between eleven and three, and soon after turning, gathered again for the cart. Thus cured, the hay is perfectly bright and sweet, and hardly a blossom or a leaf wasted. Some care is required in making the cocks. The grass is collected with forks and placed on dry ground, between the swaths, in as small a compass as convenient at the base, say two or three feet in diameter, and rising in a cone to the height of four or five feet.

The advantages of this mode of curing clover are:

1. The labor of spreading from the swath is saved.

2. The labor of the hand rake is abridged, or may be wholly dispensed with, if the horse rake is used to glean the field when the hay is taken off, the forks sufficing to collect it tolerably clean in the cocking process.

3. It prevents in a great measure, injury from dew and rain—for these cocks if rightly constructed, (not by rolling) will sustain a rain of some days—that is, they have done this with me—without heating, or becoming more than superficially wet.

4. Clover hay made in this way may almost invariably be housed in good condition; and if rain falls after the grass is mown, the quality of the hay is infinitely superior to what it would be under the old process of curing.

The *rationale* is this: the outside of the clover parts with much of its moisture while in the swath, and what is called sweating in cock is merely the passage of moisture remaining in the succulent stalks, to their exterior, and to their leaves and blossoms—it is a diffusion—an equalization of the remaining moisture in the cock. When this has taken place, evaporation is greatly facilitated, and the whole mass acquires a uniform dryness on opening the cocks to the influence of the sun, and winds, if too long an exposure is guarded against. Evaporation progresses in the cocks, after the hay is gathered for the cart, and during the operation of loading and unloading.—*Cultivator.*

EXPERIMENTS PROPOSED.

From the British Farmers' Magazine, [May 1834.]

The following hints upon experiments in agriculture have been just received by the committee [of the Saffron Walden Agricultural Society] and printed, in the hope that as it is quite unnecessary, in order to arrive at a practically useful result, that any experiment should be tried upon a large scale, some of the members of the society may turn their attention to the subjects.

The celebrated De Candolle, in his Vegetable Physiology, has pointed out several ways in which persons who are engaged in various scientific or economic pursuits, may assist in perfecting the general theory of vegetation. To each class he proposes a separate series of experiments to be undertaken by them; and, among other notices, he lays down a few rules by which an *agricultural* experimenter should direct his researches. We would more particularly refer to the following:—

1. That a set of *comparative* experiments should be instituted, in all cases where any positive result may be desired. For instance, if we wish to

know the effect which any particular treatment of the soil will produce upon a certain crop, then we should at the same time ascertain what is the effect of the soil under ordinary circumstances upon a crop of the same kind. We should not be satisfied with the results of a single experiment, but should repeat it on different soils and in different situations.

2. No remarks that are made during the progress of an experiment should be trusted to the memory, but should always be carefully and scrupulously recorded in writing.

3. The experimenter should be careful to state his facts in such scientific or technical terms as may generally be understood, or, if he uses merely local and popular language, he should so explain himself, as to be clearly intelligible.

Had attention been paid to these rules, the results of many important experiments would have been available to science which are now no better than lost labor.

De Candolle has particularly alluded to the following experiments, among others, which may be proposed to agriculturists, as likely to afford interesting results:—

1. To ascertain whether blue vitriol (sulphate of copper) is serviceable in preventing the rust, smut, and some other diseases in corn, which depend upon the attacks of minute fungi.

2. To ascertain the precise effects of gypsum or plaster of Paris (sulphate of lime) in agriculture.

(a) Whether it be equally efficacious, calcined or unburnt, in promoting the growth of green forage, as tares, peas, &c. *(Legumenosæ.)*

(b) Whether it be useful as a manure for any other tribes of plants.

(c) Whether its use hardens the seeds of the Legumenosæ so as to render them difficult to be cooked.

3. To determine, by exact and varied experiments, whether different kinds of corn intermixed in the same field will yield a greater or less produce than when grown in separate fields.

4. To prove by experiments on physiological and chemical principles, (as laid down by De Candolle,) what rotation of crops may be most advantageously adopted on different soils, and what soils, by a rotation of crops, will yield all the advantages of which the alternate system is capable.

ON HAY MAKING.

From Hayward's Science of Agriculture.

Having observed that in a season when there was no rain whatever, and the hay had been made with rapidity, and carted within a short time after it had been cut, that a greater quantity was destroyed and injured, by being overheated and burnt, than in catching irregular season; that when hay had not heated in the stalk, it was frequently mouldy; that as hay lost its native green color, and approached a brown, it lost its nutritive qualities; and that altogether the making of hay, as usually conducted, was a very precarious and teasing operation: I determined on trying to arrange a system on some more regular and certain principles, in which I succeeded; and by adopting a certain and regular course of operations, was enabled to make my hay of a uniform good quality; and, let the weather be as it might, at a regular expense of labor. And considering such a process not only of importance, as it ensures a more perfect quality; but as it affords a more certain protection against the injuries usually consequent on the uncertainty of the weather, and overheating in the stack, and that it thus removes two great causes of anxiety, it may be well worth the public attention.

In the first place as to the state of the weather, it generally happens at this season of the year that there are three or four days rain and three or four days dry; therefore on beginning to cut the grass, as it is well known that during wet weather grass may be cut, and suffered to remain in the swath for several days without injury; and it being desirable, where hands are plenty, to have a good quantity, or so much as will complete a stack in a day in the same state of forwardness; I should prefer beginning to cut during the rainy weather: however be this as it may, the swards should not be opened but on a certain fine day; and when this is done the grass should be well shaken apart and equally spread over the ground. As soon as the upper surface is dry, turn it well over; and in this operation great care should be taken to open and spread any cocks that may not have been divided in the first opening. This being done, commence raking into wind-rows, in time that the whole may be made into small cocks before night. The second day these cocks must remain untouched; let the weather be wet or dry; the third day, if the weather be certain and fine, throw the cocks open; but if the weather be wet or threatening, they may remain another day, or until the weather is certain to be fine for the day. The cocks should then be thrown, according to the crop, into beds of two or three rows and after three or four hours exposure, turned over; and taking time to gather the whole into wind-rows and cocks before night, let this operation commence accordingly, and none be left open: the day after this which in fine weather will be the fourth; the cocks must again remain untouched, or not be opened, whether the weather be wet or dry. On the fifth or next day, these cocks will only require to be opened for an hour or two, when they will be fit for the stack.—The novelty of this mode consists only in suffering the hay to remain in the cock the second and third or alternate days; and at first sight it must appear that so much time in fine weather must be lost, but this is not the case. Whilst the hay remains in cocks, a slight fermentation, or what is termed sweating, will take place and in consequence, after it has been opened on the third and fifth days, it will prove to be just as forward as if it had been worked every day. And the advantages resulting from this, are obviously the following; by shortening the time of open exposure, the color of the hay is more perfectly preserved, and consequently the quality; and the fermentations or sweatings which take place in the cocks, proves so much to have diminished that principle, or inclination to prevent its heating injuriously in stack; and the whole operation of making, whether it takes four or eight, requires three day labor only: and the hay being left in that state every night, in which it is the least possibly exposed to the injuries of the weather, and in which it may remain for a day or two in uncertain weather, without injurious exposure; much painful anxiety, and useless attendance of laborers are obviated.

NORFOLK, ITS FACILITIES FOR COMMERCE CONTRASTED WITH THOSE OF WILMINGTON, &c., &c.

For the Farmers' Register.

"*Statistics of North Carolina.*—In Mr. Bryan's speech I find a memorial relative to the inlet of Ocracock. It demonstrates that the annual product of the district of which the port is the vent, is, - - - - - $5,000,000
That it employs of shipping in tons, 200,000
Of seamen, not less than - - 10,000
That the expense direct and indirect incurred by this shipping at 1 per cent. on imports and exports is $75,000
On the ships, - - - 60,000
Lighterage and detention at the Swash is, - - 200,000 $365,000

Or an annual tax of between 7 and 8 per cent. producing a loss in commerce of an immense amount, when, in fact, all this charge might not only be saved, but the commerce itself increased in an immense ratio.

Mr. Bryan proves the correctness of the idea, by stating, that staves commanded $40 per thousand at Suffolk, (Virginia,) the head of the Nansemond navigation, while at Murfreesborough and Winton, on the Chowan (both about 30 miles distant from Suffolk,) they only sell for $25. At Washington, Newbern and Edenton, they are scarcely worth $10, while at Wilmington, they readily sell for $18 and $20. What is the conclusion? That, if the access to the Atlantic was as good by Ocracock as by Wilmington and Norfolk, the above $5,000,000 worth of property would be shipped without the charge of the $365,000, and that staves *delivered at Norfolk are worth double as much as at Wilmington.**

When so clear a benefit to be derived from a little exertion, and compared with the object in view, so trifling an expenditure, it is no great compliment to the collected wisdom of the annually congregated councils of North Carolina, that they have so long been blind to a work they might so easily have achieved, and one that would instantly have produced the desired effect.

Every man that has ever been at sea, cannot but recollect the sailor's distich,

"If Bermuda let you pass,
Have a care of Hatteras."

Nature, in placing Hatteras where she has, has interdicted almost to every port in North Carolina, the means of becoming the mart of extensive foreign trade. The Cape Fear river might be excepted, as offering a tolerable harbor—but, Wilmington has been so placed, as to preclude the possibility of its ever becoming a port of consequence. The difference in value of the same material in Wilmington and Norfolk cannot be forgotten. It speaks volumes.

I assume this, and now proceed to prove, that not only might this $365,000 *per annum* have been saved; but, that the commerce might have doubled; so, that the loss is two fold.

But, it is only to be done by a sacrifice, and hence I proceed to ask what will be that sacrifice?

It will be, the ridiculous notion, that each state must have a large importing port, while (to say nothing of the *few ports* of that description in the Middle and Eastern Sections of the United States,) Great Britain has not more than six, Ireland only two, and France not five. These countries with their enormous and overgrown populations, can do with these few large ports, while North and South Carolina and Georgia, with only about 1,000,000 whites and 700,000 blacks, (the latter consuming but little,) are to have three large importing ports. The ascendency of Charleston, ever since the establishment of North Carolina and Georgia as separate governments, fully demonstrates this fact. The charters of the Charles and the Georges, have never altered this decree of circumstances. It is in vain, that the *essential* interests of these states are sacrificed to the imaginary lines drawn at the time, for the purpose of convenience and the increase of royal patronage. It is time they should all pull together, and by the establishment of two principal ports, uniting with Virginia, thus offer the means of erecting ports that may partially rival New York and Baltimore.

It is in vain that visionary men call on us to see what may be done by an expenditure on the Ocracock Inlet. The whole coast of the Carolinas is one dreaded by the seaman, and there are but two ports accessible to ships of war of any moderate descriptions. The patronage of government, royal and republican, and the result of circumstances, has, I repeat it, made Charleston what it is; but, the establishment of the inland towns on the healthy and purely watered sand ridges, and the increased accessibility to the Northern Cities, (its convenience and ease hourly augmenting,) has turned the attention of *the consuming population* of the three States to those cities for their foreign supplies. I maintain, that in a commercial point of view it is their interest to have this source of supply as near to them as possible, and, that in every point of view, it is their business so to sacrifice local prejudices, as to offer the best military port to the United States for the establishment of a marine depot.

This marine depot should be Beaufort in South Carolina. If Georgia had not been settled, the probability is, that it would have been the capital of Carolina. Bowen (1747) says "*it is already the station of the British squadron in these seas.*"

It is thus described by Drayton in his view of South Carolina, (p. 32, Charleston, 1802.)

"Broad, Coosaw, Port Royal, and other short rivers, are more to be considered arms of the sea than rivers of the country. By their various meanderings, they insulate nearly *one-fifth* of Beaufort district."

"Their waters are deep and their navigation suitable to heavy vessels of war; hence Broad and Port Royal Rivers, are supposed to be equal *to the safe accommodation of the largest and most formidable navy.*"

"The bar or entrance of the Broad is almost a

* As a practical illustration, I would state what I have understood to be a fact. A ship (the Homer) trading between Charleston and Bourdeaux wanted staves. At Charleston they were not to be had; nor was she more successful at Wilmington; but, after all her expense at Wilmington, was compelled to go to Norfolk. This happened, as I have heard, last year. If the $150,000 spent on the Swash, &c. had been laid out on a rail road across North Carolina, it would have rendered some service. Its outlay now is on a fruitless work.

mile wide, carrying a depth of nearly twenty-three feet at *low* water. The mouth of this river, at the sea, from Hilton Head on the one side, to the Hunting Islands on the other, is between seven and eight miles; and it penetrates a wide and nearly straight course, some distance into the country, insomuch that a vessel runs below the visible horizon in going up the river, as if she were at sea. Also, many rivers of less note discharge their waters therein. Hence, the appellation of *bay* would be a more appropriate term, for *this noble expanse of water*, than that by which it is at present known—that of Broad River."

As a commercial depot, it may become the exporting port of the western states; for, if a rail road can be laid down from the Ohio to Baltimore, it certainly can from the gulph of Mexico to Beaufort.

A rail road from thence to Augusta would be a cheap and easy achievement. It will be the subject of a separate paper.

The expense annually incurred by the loss of steamers in the western rivers to get their produce to market, and the amount of one year's damages arising from the dangers of the gulph of Florida, incurred by the underwriters, would pay the whole expense.

Hence, my proposition would be to lay down a railway of the simplest description; or, should the subject on discussion prove worthy, a better one of a permanent character.

We will suppose Newbern to be the centre of the commerce now impeded by the "deplorable" state of Ocracock, and destined to be eternally harrassed by the shoal of Hatteras.

The distance from Newbern to Wilmington, on the Roanoke is 60 miles—from thence to Murfreesborough, the same—from thence to Suffolk 40—in all 160 miles. A railway at $1000 a mile would according to Mr. Fulton, be $160,000 or not one half the expense annually and actually incurred by the attempt to navigate Ocracock. Should this succeed, a railway from Fayetteville to Raleigh, and thence through Halifax to Murfreesborough, where a union with the lower branch could carry all the produce of North Carolina to an easy market, and a port [Norfolk] that might become one of the most important commercial and military depots in the middle, would render the most useful results to the Middle States, while the commerce of the west will eventually confer the same benefit on Beaufort in the Southern States.

This may be a dream, and its writer be called a visionary—but, it can do no injury, even should it have no effect. And, as the motive in composing it is pure, I send it for insertion in the Camden Journal. I assume the title of one who in his own age was deemed a visionary, but, in ours is found well worthy of our gratitude and respect.

I confine my views to the *single* effect it would have on the commerce of North Carolina. As a measure tending to the general convenience of making it the great passage from the west to the east, and *vice versa*, travelling, &c. &c. much might be said. They are obvious. The distances stated are not perfectly accurate; but sufficiently so to elucidate the subject.

WORCESTER."

With the exception of Drayton's account of Beaufort and a paragraph relative to a rail road to Augusta, the above paper was published in the Camden Journal for the 10th May 1828. Its actual bearing on the line of rail road that will have to be laid down in the first instance from Fayetteville, and at a future and no distant period, from the farthest west, is very important; and, it is rendered more so by the illegal attempt at imposition (for it deserves no other term) made by the corporation of the Charleston and Augusta Rail Road on the General Post Office.

To facilitate the correspondence of the country as well as to cheapen its conveyance, and add to its celerity, was a leading motive to an advocacy for the adoption of rail roads; and, especially to cheapen its conveyance must, originally, *have been* the object of the above named company. For, in Mr. Dexter's pamphlet we find the following observations:

"Sundry freights from Augusta, and the mails, - - - - -	$10,000
Way passengers and travel from Greenville and Columbia, with mails, horses, carriages, servants, &c. equal to fifteen passengers at $5, - - - - - -	27,375"
In the latter instance on no mail is there any calculation made; but, the company is now asking the government for the conveyance of the mail from Charleston to Augusta, - - - - - -	$50,000

Or five per cent. on the capital they *have* expended, and six per cent. on what ought only to have been expended.

That such a charge was, until now, never contemplated is evident from the estimate they made of their net income, $229,140, $138,960, or $120,960; and one of the directors (Mr. Miller,) ventures "to predict that before the expiration of three years, the mail will be transported from this city (New York) to New Orleans in eight or nine days."

What was the language of the Charleston Mercury?

"The Augusta *Courier* states that the Charleston morning papers are on its reading room files, by breakfast time the succeding day: and that it is expected to get them on the evening of the same day, when the rail road is completed."

"The United States Mail and stage passengers were transmitted on it nine months before any other company transported it on a rail road; and it is questionable if any extended line of communication of an efficient and permanent character, whether rail road, turnpike, or canal, has been executed in so short a time, or at a cost approximating so nearly to the original estimate.

The cash receipts for April, 1833, freight and passage are upwards of $3,600.

The total for May, 1834, was $18,000.

This demand on the part of the company, and the recent report as to the financial condition of the General Post Office, will lead to the question, whether its revenues ought not to be pledged for the interest on, and final discharge of, the principal incurred in the formation of rail roads for the conveyance of the mail.

If a consideration of this kind is rendered imperatively necessary, by the conduct of the

Charleston Rail Road Company—if they are to charge $50,000 for the conveyance of the mail for 140 miles, it would cost $500,000 for the great mail from New Orleans to the eastern frontier of the United States. And at the very moment they are making this charge they are furnishing the means (innocently and unavoidably I grant) to thousands of individuals to take from the General Post Office that postage which, it is at such a heavy expense to collect. For I have no doubt, the letters sent by private hands from Augusta to Charleston, and thence to New York, have been so numerous as to deprive the office of a very large sum of money.

In conclusion, I would observe, that in one year, there have been paid in Alabama, $157,000 for the conveyance of the mails. This sum would pay a five per cent. interest on $3,140,000, or, at $4,000 per mile, would make 800 miles of rail road; and a rail road this very year from any central point in Alabama to Beaufort, would have added from $3 to $6 value on 100,000 bales of cotton; or, from $300,000 to $600,000 to the inhabitants of the west. Hence, there would be no difficulty in thus constructing rail roads—the government to furnish the surveyors, &c.—the state to furnish their equipage and subsistence—the post office revenue to be charged for two-fifths of the interest on the capital to be borrowed with the guarantee of the government of the United States for the purpose—with such a guarantee, it may be had in London for three per cent.—the state and individuals to furnish the remaining three-fifths, it being understood, that the two-fifths furnished by the General Post Office revenue, shall, provided the mail is carried free of any charge, be eventually relinquished on conditions to be hereafter determined on just and equitable principles, to the holders of the remaining three-fifths of the stock. This is perhaps, a feasible plan, and one, which, I trust, will excite the attention of the numerous and intelligent readers of your valuable publication.

SMEATON.

BEAUFORT, OR PORT ROYAL, SOUTH CAROLINA—ITS ERECTION INTO A NAVAL DEPOT—ITS CREATION INTO A PORT OF HIGH COMMERCIAL IMPORTANCE—AND THE RAIL ROADS NECESSARY TO THESE OBJECTS.

For the Farmers' Register.

There are few persons, to whom the capabilities of a country are a matter of the highest interest and observation, who must not be surprised to see the neglect which some places experience, and the profound insensibility with which the greatest natural advantages are oftentimes regarded.

Perhaps neither in the United States, nor any where else, is there to be found so striking an instance of inveterate ignorance and total want of perception, as in the case of the town and port of Beaufort, S. C. Early in the settlement of the country, it was justly deemed a port of importance; but the fear of the Indians and Spaniards in the *first* instance, and the erection of Georgia, into a separate colony, in the *second*, have united in obliterating Beaufort from the list of ports; although for ships of war, it is the only port on the whole coast of the United States, from Norfolk to Pensacola, worthy the name.

During the Revolution, it proved its value to the enemy, whose accounts state that Beaufort or Port Royal "is an island possessed of an excellent harbor, and many other *natural* advantages; from its situation also commanding all the sea coast from Charleston to Savannah."

Nor to the facilities it afforded a foe, were the defenders of the soil insensible. General Moultrie speaks of the fact of two *small* men-of-war, and a *few* troops possessing it, as a reproach to congress. However he forgot the then naval superiority of Great Britain, and in the actual state of affairs, an almost, if not quite equal land force—two circumstances that must be recollected; and especially as the general also states, that at "Mile End there is a narrow neck of land, about a mile from the town, not more than three hundred yards across, and on each side of this neck a navigable river:" and that of all the advantages the king's troops from their uninterrupted possession of the island could avail themselves.

Its facilities for a sea port and naval arsenal are thus rendered evident. I apprehend "*two small men-of-war*," will prove that the largest frigate could lie in the harbor with perfect safety; and the "narrow neck, only three hundred yards across, may *possibly* demonstrate that a canal across this neck would facilitate the scheme, to forward which, is the object of this paper—and *certainly* a rail road.

It will be remembered that so shallow is the draught of water at Savannah and Charleston, that generally speaking, such ships as the Washington, Great Britain, United States, France, and Sylvanus Jenkins, rarely come into either port. They carry from 1800 to 2400 bales.

It will also be remembered that there are large masses of pine forests at the Edisto, the timber cut from which might, by a transverse rail road from the Charleston and Augusta Rail Road at Branchville, be brought to Beaufort more easily than it can now to Charleston; and, when at Beaufort, could be more easily accommodated by the *large* timber ship, now impossible to be used in either the harbor of Charleston or Savannah.

It will also be remembered, that when the superiority of the road from Beaufort to Columbia is recollected, the distance will be the same between Columbia and Beaufort as between Columbia and Charleston; and if the transverse rail road can be effected, produce and merchandise can be transported at an infinitely cheaper rate.

The road from Beaufort to (say) Branchville, can be constructed at an infinitely less expense than that from Charleston to Augusta. The steps that will have to be taken at Beaufort, must be the subject of future discussion. At present, it should seem, that either a canal from the eastern to the western waters, that *possibly* may be made in such a way as to be a dock, (for the accommodation of shipping) and so placed as to terminate at a point as nearly opposite as possible to Boyd's Neck, or directly across the island at Mile End, would serve every useful purpose in the conveyance of produce to the shipping, and merchandise to the interior. However this part of the subject is *ad referendum*.

We will recur to the great end, which is to convey the produce from the Savannah at Augusta, to Beaufort, and the merchandise to the interior.

The first object would be the conversion, if pos-

sible, of the Union Turnpike into a cheap rail road, and its continuance to the waters of Beaufort. This would be useful, and to the final accomplishment of the scheme for rendering the port of Beaufort the great port on the Atlantic for the conveyance of all the produce of the west to its cis-atlantic as well as trans-atlantic markets, imperatively necessary. To perfect it, a cheap rail road from Port Royal to Hamburg and Augusta, will be requisite.

If the point of contact is to be the river at Boyd's Neck, it should appear, from the district map that a rail road might be laid down from that place to Robertsville, or between the heads of Bees' Creek and Great Swamp, at Riley's—thence to the church opposite Mathew's Bluff—thence to Mr. Cohen's bridge on Upper Three Runs—thence to Minor's Bridge—thence to Hamburg, and, in fact, Augusta—a distance of one hundred miles. The rail road to be of the simplest description: in short, to be a track road to pursue the undulations of the superficies, and to use the best and most solid ground.

This it is to be presumed may be laid down for $2400 per mile, or $240,000.

There is no doubt that as soon as the Athens and Augusta Rail Road can be finished, fully 200 to 220,000 bales of coton will be brought down it; and if the road here proposed should be laid down, fully 400,000 bales of coton* will be shipped at Beaufort; and further, that if, as in all probability will be the case, a road shall be made from the mouth of the Chatahooche to Savannah, it is very likely little short of 600,000 bales of coton will be sent from thence to their destined markets. Of the returning merchandise, I take no notice.

SMEATON.

DOMESTICATED FISH.

The Easton Sentinel mentions that a trout of enormous size was recently presented to a dinner party at Bethlehem, Pa. by Mr. G. H. Goudie, and adds the following particulars—from which it seems that the rearing of fish in this novel mode may be conducted successfully.

"——— The trout measured 22 inches in length, 19 inches in circumference, and weighed 7⅓ pounds. It was raised by Mr. Jacob Schneider of the Lehigh Water Gay, who had kept it for the last six years in a trough in the second story of his house. We understand Mr. G. of Bethlehem has about 400 fine trout yet in his front house, measuring from 10 to 17 inches in length."

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* Though I am no disciple of Webster or of Grimke, I think this the preferable way to spell "*cotton*," and request your compositor will leave my "*coton*" in *statu quo*.

[The request of our correspondent is complied with at this time—but hereafter we beg leave to adhere to our own old fashioned mode of spelling "cotton," as the adoption of that above (even if correctly derived) would be attributed by most readers to the ignorance of the editor, rather than to the learning of his correspondent.]

WILD ONION—GYPSUM—LEGISLATIVE FARMING.

Fairfax county, June 17, 1834.

To the Editor of the Farmers' Register.

Your correspondent J. E. M. of Cambridge, Maryland, wishes to know what he is to do in relation to that pest, wild onion. The experience of thirty-six years induces me to believe that it cannot be rooted out. Perhaps if he could sift the earth for five inches in depth, and burn the roots he might get relief—yet a neighbor of mine believes that the ashes of that pest will reproduce the root.

I once ploughed a field ten or eleven inches deep, with the hope of smothering this root, and succeeded so far as to destroy the greater part: but that which was left soon filled up the vacuum. I have after various and repeated experiments, settled into the following practice. Cultivate the land in corn, or seed in oats, and never give your last ploughing for wheat, or any fall crop, until 10th October. The roots will then have forced up all their shoots to a fresh and strong growth—and you will so far cripple the plant as to have no seed from it at the following harvest.

As I find many opinions in your publication about the quantity of plaster to be used upon an acre of land, let me say how I have used it. I have applied it every month in the year, varying the application from one to ten bushels per acre. Ten was injurious—one not enough. The best mode of using it is from one to two bushels in September or October, and the same in April or May. The whole amount at either season will not do so well; yet, in either way, a young farmer might be excused if he lost sight of his land marks, and became doubtful of being upon his own old naked farm.

You and your very respectable correspondents will excuse me for a few words on "legislative farming." It will not do—the state has no money for imperial experiments—and I venture to say, that if you spend ten hundred thousand dollars in this way, you will blush in the retrospective view of it. I mean nothing other than perfect respect sir; but, old as I am, had I that celebrated ram's horn of Joshua, which he was used to blow around the camps of his enemy, I would go around this state bare-footed, and sound the alarm against governmental experiments. I am almost ready to say that I would make governmental experiments a penitentiary offence. What are the half million of farms that are spread over this state but experimental farms? Does not every cultivator apply his labor with an eye to the result? What more then is wanting, as relates to practical and profitable cultivation, than to communicate through your paper, what has been done, and the result in *dollars and cents?* Is it necessary that we should have a score or two of officers with fat salaries to learn us how to farm? Poor mortality! how often have I seen thee *create* maggots in cheese to make it better! Could I raise letters of polished brass upon the rainbow, they should warn the good people of Virginia to stand aloof of office, and office seekers.

Our corn is mending—our oats better than we looked for—and our wheat, though one week later than usual, is quite as good as we could have expected. Upon looking over my memorandum

book I find that seven years ago I cultivated the same field in corn, and that upon the 8th day of June, we ceased to cultivate it: this year we must cultivate it to the 15th July—so much for difference of seasons.

JEREMIAH.

CALCAREOUS ROCK IN PRINCE EDWARD.

To the Editor of the Farmers' Register.

In the first number of your first volume, is a communication from me, on the subject of argillaceous marl, containing also such a description of the local peculiarities of the region in which this substance is found, as I could give, without a regular knowledge of geology. In a note appended to that communication, you were pleased to regard the discovery of this mineral manure, as promising benefit to the agriculture of our state. Although the expression of this opinion, was highly gratifying to my feelings, I considered it best, on account of the necessity of directing my laboring force to other matters, and the extreme difficulty of suitably operating on so excessively tenacious a clay, to await the result of applications already made, before making preparations for the general diffusion of marl over my land. I moreover hoped, that by occasionally devoting some time to the search, I might discover something richer in calcareous matter than the weak marl already found; for, in the note above alluded to, you remark, that "the sources from which the fluid calcareous matter exudes, and which concretes by age, are probably much richer; and searching for them by boring would probably repay the labor." I have accordingly spread but little marl for the last year, but have been watching, as I found opportunity, for something better. It is proper, however, that I should state, that I can show very promising young clover on land manured only with marl, which I considered, two years ago, as poor as any in this county.

Having succeeded, as I think, in discovering one of the sources of the marl on my land, I lay an account of it before you for publication, if you think proper.

In a ditch, mentioned to you in a previous letter, now washed into a deep gulley, I found a considerable quantity of selenite and calcareous concretions imbedded in the clay. These materials, I observed, could be traced from the mouth of the gulley, in considerable abundance, up to a ledge of rock crossing the gully; but scarcely any such things could be discovered above the ledge. Moreover, immediately about the ledge, was a deposite of marl, much richer than any I had previously seen on my land. These circumstances led me to suspect that the rock itself was calcareous; and on breaking a piece of it, and applying acid, I witnessed a considerable effervescence.

The ledge at its outrunning appears to be five or six feet in thickness. The rock on the outer surface is of a rusty yellow, or light brown—inwardly of a dark purplish gray color. On polishing, it becomes nearly black. Being susceptible of a fine polish, it may be considered as a species of marble. When undergoing a little brisk friction, it emits a strong odor resembling that of bone filings. According to the analysis made by my young friend Mr. George W. Dame, of Hampden Sydney College, it contains the following constituents and proportions in one hundred grains.

Carbonate of lime,	52. grs.	
" " magnesia,	4. "	
" " soda,	6. "	
Oxide of iron,	8. "	
Sulphur,	3.	In the form of sulphuret of copper in the rock.
Copper,	4.5	
Manganese,	2.	
Silica,	8.	
Alumine,	10.	
	97.5	
Loss,	2.5	
	100.	

I believe that common gypsum and limestone are not often found in a coal field, but that in their crystalized forms (as selenite and marble) they are frequently accompaniments of coal. I suspect, that much of the hard dark gray rock, dug from the coal pits in the counties below this, would be found, on the application of acids, to be calcareous.

Besides the ledge of rock above mentioned, there are several others of much the same appearance, which effervesce equally with acids; but they have not been regularly analyzed. After a suitable application of heat, (viz: not very intense but long continued) they may be slaked into a fine powder, much resembling ashes. They readily become vitrified by the strongest heat of a furnace.

Whether this rock is to be useful, either in agriculture or masonry, time and experiment must determine. I have, as I deemed it my duty to do, stated facts, because I suspect that such rocks abound in this middle country. I conclude with hoping that others will aid in the investigation of such matters. A few cents worth of muriatic acid would enable any gentleman to try a great many rocks and earths, whether they be calcareous.

W. S. MORTON.

Near Farmville, July 3d, 1834.

REMARKS ON THE DISCOVERY OF CALCAREOUS ROCK IN PRINCE EDWARD, AND OF THE GREEN SAND IN THE LOWER COUNTIES.

The foregoing communication furnishes a new example of the discovery of valuable mineral materials for manure, produced by zeal being directed to such investigations, although unaided, as the writer states, by any regularly acquired geological knowledge. Still, imperfect as may be Dr. Morton's means for these pursuits, and confined as his views have necessarily been to the narrow limits of his own neighborhood, he has now and previously made known facts, and stimulated others to seek and to reach similar results, which cannot fail to prove of great importance to the agricultural improvement of Virginia. If these several facts had been discovered and announced by a regularly instructed geologist and chemist, their novelty and importance would have been sufficient to add something to the name of highest reputation: and if such labors had been obtained by the direction, and at the expense of the government, that expense would already have

been amply compensated. In making these remarks, it is not so much our design to do honor to Dr. Morton, however well it may be merited, as to call attention to the value of results obtained by such feeble means for investigation, compared to what might be done, by a proper geological survey of all the different regions of the state, such as Maryland has already undertaken. In the mean time, while our legislature slumbers over the most urgent claims of agriculture, or rejects them with impatience or contempt, let individuals at least do something to bring our mineral resources for improvement to light—and various examples to be found in the Farmers' Register, prove that in this manner much has been done, and may yet be done, by such means alone. If the establishment of this journal had done no other good than bringing out these discoveries, its value to the community would have been at least equal to the cost of its maintenance.

Among the most valuable of these discoveries we believe will be found that of the *green sand*, announced in the communication of Professor Rogers in the first part of this number. We rejoice that this and other kindred subjects have been undertaken by an investigator having suitable scientific attainments, as well as zeal for the pursuit. This discovery is as yet but dawning, and the examinations of many persons guided by the directions given in Mr. Rogers' communication, may be usefully employed to aid him in the pursuit. These aids we earnestly hope will be afforded: and those who may offer them, will no doubt serve their own private interests, as well as that of the public, by such labors. We will take pleasure in transmitting to Mr. Rogers any specimens which it may be more convenient to send to Petersburg, or to Shellbanks, than directly to him at William and Mary College.

These latter remarks would have appeared better placed immediately after the piece to which they refer. But our silence then was caused by the expectation (which unavoidable circumstances have compelled him to disappoint) that the author would add the result of an examination of the stratum of "gypseous earth," which we have believed to be very similar to, if not identical with the *green sand* or *Jersey marl*. This examination will yet be made: and we feel confident that there, and still nearer the falls of the rivers, will be found in the greatest quantities the earth described as green sand.

FERTILIZATION OF OLD LAVAS.

Among the practical consequences that result from the facility with which Cacti strike from cuttings, there is one which deserves to be noticed, on account of its importance, viz: the manner in which the *Opuntia (European Indian Fig)* is employed to fertilize the old lavas at the foot of Mount Etna. As soon as a fissure is perceived, a branch or joint of an opuntia is stuck in, and the latter pushes out roots, which are nourished by the rain that collects around them, or by whatever dust or organic remains may have collected into a little soil. These roots once developed, insinuate themselves into the most minute crevices, expand, and finally break up the lava into fragments. Opuntias treated in this manner produce a great deal of fruit, which is sold as a refreshing food throughout all the towns of Sicily.—*De Candolle.*

AMHERST AGRICULTURAL SOCIETY.

For the Farmers' Register.

At a meeting of a portion of the citizens of Amherst county, convened agreeably to public notice, for the purpose of organizing an Agricultural Society.

Capt. Edmund Penn was called to the chair, and Robert Tinsley appointed secretary.

The society then proceeded to the election of officers for the ensuing year; whereupon,

Dr. James Powell was duly elected *president;* John Jaquelin Ambler, *vice president;* Howel L. Brown, *treasurer;* Arthur B. Davies, *secretary.*

James Powell, John J. Ambler, John Thompson, Arthur B. Davies, Howel L. Brown, Joseph Pettyjohn and Robert Tinsley are appointed a committee to report to the next meeting a constitution and a system of bye-laws for this society.

Ordered, that Judge Lucas P. Thompson be requested to deliver an address before this society, on the 21st day of July next, at 10 o'clock, in furtherance of the objects of the society, and that the secretary do furnish him with a copy of this order.

The society is adjourned, till Monday, the 21st of July next, 10 o'clock. ED. PENN, Chair.

Robert Tinsley, Sec'y.

ON HILLING CORN.

From the Courant.

As the season for hoeing Indian corn approaches, the writer of this article takes the liberty of suggesting to farmers in his vicinity, a few hints relative to earthing or hilling up at the second and third hoeings, or as it is commonly called, *half hilling* and *hilling*.

The practice of most farmers within my acquaintance is, at half hilling to accumulate the earth from two to four inches, and at hilling from three to five inches more, making each hill a pyramid of about seven inches elevation. The reason offered in support of this practice is, that the corn will stand firmer and more erect, and therefore be less liable to be broken down by the wind and rain.

More than fifty years' experience in this branch of agriculture has taught me that this is erroneous both in theory and practice. By accumulating earth upon the roots of the corn they are deprived of that influence of the air and sun which are necessary to a healthy and vigorous growth.* Every one acquainted with the natural growth of this plant, must have observed the peculiar formation of the *brace roots* which sprout upon the stalk in a circular form a very little below the surface of the ground, radiating from the stalk in every direction. In like manner are the stalks of wheat, rye, barley, oats, &c. furnished with their brace roots, and

* It is well known where excavations are made in constructing canals and rail roads, and the earth to any considerable depth thrown upon the roots of large and healthy trees, it causes their death within a year or two, by placing their roots below the influence of the air, and warmth of the sun—the same effect is produced, and from the same cause, where timber land is flooded by water.

stand in no need of hilling up to give them strength and firmness in their position. They are evidently designed to stay the stalk and hold it in an erect posture, not unlike the shrouds of a ship to sustain the mast. To render these braces sufficiently hard and strong to answer the design of nature, they must have the influence of the sun and air; but when buried by several inches of superincumbent earth, they become soft, weak, and brittle, and nature to remedy this evil sends out another set above the former. These occasion an unnecessary waste of the nourishment of the plant, and at that advanced season of the year never become sufficiently indurated to perform their office to the best advantage.

If those farmers who may take the trouble of reading this article, should doubt the correctness of this reasoning, they are respectfully invited to test it by experiment upon a few rows or hills. For many years past the writer has practised upon the principles here recommended, and has uniformly been successful in his crop.

It may also be remarked that great injury is done both by the plough and the hoe at the time of hilling, by breaking and wounding the long fibrous roots so necessary to the growth and strength of the stalk. After the weeding or first hoeing, neither the plough or the hoe should be allowed to penetrate any deeper than is necessary to destroy the weeds and grass.

In cultivating the potato, the same reasoning so far as it respects the accumulation of earth, will apply—the bulb is formed simultaneously with the blossom bud. If, after that period there be much *hilling* up, the first formed bulbs grow but little; being out of the reach of that warmth and air which are required for a perfect growth, and another set above them is produced. Hence it is that by this mode of culture so great a proportion of the crop consists of small bulbs. Every cultivator must have observed that the largest potatoes in the hill are invaribly found near the surface of the ground.

CORNPLANTER.

A GOOD CROP OF TOBACCO FROM NOTTOWAY.

From the Richmond Whig.

A crop of 6 hhds tobacco, made by Mr. John Webster of Nottoway county, was sold at Shockoe Warehouse, on Tuesday last, [June 3d] at the following prices:

	1 hhd at	$13	50
	1 hhd at	12	50
	1 hhd at	11	
	1 hhd at	10	25
	1 hhd at	9	25
Short tobacco	1 hhd at	6	

Average—$10 41.

THE WILD OR CANDLEBERRY MYRTLE, A REMEDY AGAINST THE DEPREDATIONS OCCASIONED BY THE WEEVIL.

From the Southern Agriculturist.

Dear Sir,—Information on all and any subject, connected with agricultural pursuits will, I presume, find admittance into your periodical, and although the notice may be of apparently small matters, yet to some one of your readers, it may be new, and let me add, valuable. I am induced to make these remarks from the inconvenience I suffered for many years, from the destruction of my corn by weevil, and the total absence of them now, in consequence of the application of a very simple remedy. The land which I plant in corn is low, and requires almost as much draining, as the river lands, but is productive, and yields abundant crops. Whether it is owing to the location of the land, or other (to me) unknown causes, I am unable to say, but the fact is, that the corn is often taken from the field with a great many weevil in it. No injury seemed to result from their residence in it, while in the field, or during the cold weather, but as soon as the summer's sun had shed his genial warmth upon us, these intruders gave notice of their existence, by commencing the work of destruction. Upon several occasions my provisions were materially injured, and much complained of by the consumers—I tried a variety of remedies, without effect. Late planting, and early planting, were both suggested and tried; the land was all broken up deep in the winter, with a plough; the seed was coated with tar and soot, and finally was brought from one of the sea-islands at a distance and planted. The crops, I think, were improved by each of the remedies in quantity, but the enemy still retained his position, unmoved, and apparently immovable. I was one day mentioning the circumstance to a friend, who told me that he had understood, that the wild myrtle, *(Myrica cerifera)* was a sovereign remedy for this seemingly incurable disease. At this time the destruction had commenced, and the insects were to be seen in every direction; a quantity of myrtle was procured, and spread over the top of the corn, and directions given to follow it up, if any effect was visible. My removal to town for the summer, prevented my attending to the business any farther, and I learned upon inquiry in the fall, that "it seemed to check the weevil in some degree." This was not satisfactory, and as the corn in the field was apparently more than usually infested, I determined to give the experiment a fair trial. The corn-house was emptied, and swept, and washed with boiling water; the floor was then covered with myrtle; a layer of corn about a foot deep was then brought in, and then a layer of myrtle, and this management continued throughout the whole harvest, observing to cover the top of the corn with a bed of these little bushes. During the winter I several times examined the corn, near the door, and saw no weevil, yet I was fearful, that in the body of the house, the mischief might still be going on. Late in the spring we began to use the corn freely, and still found no weevil; the crop was eventually consumed, and was to the last, entirely free from insects of all and every kind.

This was to me satisfactory, and the rule has been uniformly observed of strewing the house with myrtle, and no weevil have since been seen. My corn-house is divided into two bins, and an entry; and this year I had planted a small field alone, and desired that it might be kept separate. Into this entry it was thrown, and no myrtle was put with it, but the two bins were as usual well supplied. Upon my examining the corn-house, I found the corn in the entry filled with weevil, while that in the bins was perfectly free from all insects. The corn was immediately removed, and though filled with insects, was divided between the two bins, and myrtle plentifully strewed over the top of each. I am now eating the corn, and the weevil are no where to be found.

This last accidental experiment is more convincing than either of the others; here the two bins were free from weevil, and the corn which was separated from them, only by a loose board partition was filled, and I have little doubt, would have been rendered unfit for use before the summer was over. Perhaps, Mr. Editor, in giving you and your readers the information detailed in this paper, I have been carrying "coals to Newcastle;" if so light your spirit lamp with it, and I shall be satisfied, as my only object is to do good and not to see myself in print.

With my best wishes for your restoration to health, and success in your pursuits, I remain your friend. Z.

ON THE EXCRETORY POWERS OF PLANTS.

By Mr. Towers, Author of the Domestic Gardener's Manual.

From the [British] Journal of Agriculture, of 1831.

The paper, at page 320 of this volume of the Journal, entitled "De Candolle's Theory of the Rotation Crops,"* refers to one of the most interesting disquisitions that has ever claimed the attention of the agriculturist. It is on a subject that may perhaps stimulate the farmer to reflection and experiment, and tend to abate that prejudice which has but too extensively induced the cultivator to view the reasonings, and even the discoveries, of scientific men, as so many innovations upon the beaten path of routine practice.

Upon these considerations, I hail the appearance of this article, which I have perused and reperused, again and again, with fresh satisfaction. But, while I earnestly recommend the intelligent agriculturist to study it with deep attention, and cordially join in the hope expressed by the Editor, "that the chemists of our own country will prosecute the interesting investigations of M. Macaire;" —while I thus urge the farmer to study, and the man of science to investigate, the theory, it is but justice to myself to vindicate my own claim to originality,—comparatively so at least in respect to the hypotheses brought forward at this time, and said to be established by facts. I disclaim wholly the idea of detracting from the merits of any author, or of building upon any man's foundation; but when I perceive that a theory is advanced or claimed as recent, which I can prove, beyond a doubt, to have been pointedly and distinctly advocated by me above three years since, I conceive that I am imperatively called upon to make public, by the means at my command, those remarks upon the excretory powers of plants, which I penned in the year 1830.

They who are in possession of the *Domestic Gardener's Manual*, will observe, that when noticing the "*Rotation of Crops*," at paragraph 539, page 430, of that work, I add,—"A rotation of crops is considered by most to be of absolute necessity; and chiefly on the supposition that each plant draws a somewhat different nourishment." I am prepared to admit that each individual vegetable *elaborates its own specific nutriment;* that is, it induces decompositions, which afford it a supply congenial to its own peculiar habit and constitution. I also advocate a rotation or change of crops, not, however, on account of the necessity of recruiting an *exhausted soil*, but for the reasons adduced at paragraph 499, under the article "*Raspberry.*"

Referring to that paragraph, page 397, we find—

"Experience proves, that to have a constant supply of fine fruit year after year, the ground must be frequently changed. Thus, after the raspberries have borne fruit four or five years, one or two roots should be taken up, the strongest suckers selected, and immediately planted in fresh ground. Whenever raspberry plants are removed to another situation, the old ground ought to be well manured, deeply digged, and turned; and then it should be placed under some vegetable crop. By this mode of treatment it will be brought into a condition to support raspberries again in two or three years. *This is a curious and interesting fact*, one which proves that it *is not solely by exhausting the soil* that certain plants deteriorate, if planted in the same ground, year after year; for, were this the case, *manure would renovate the ground;* but it fails to do so, and thus, if peas or wheat, for example, be grown repeatedly on a piece of land, the farmer may manure to whatever extent he chooses, his *crops will dwindle* and become poorer and poorer. This is remarkably the case in the Isle of Thanet, where, to use a local term, if the land be "*overpea'd*," it becomes as it were poisoned; and if peas be again planted, though they rise from the soil, they soon turn yellow, are "*foxed*," and produce nothing of a crop.

"To account for this specific *poisoning of the soil*, we must suppose that *particular plants convey into the soil, through the channels of their reducent vessels, certain specific fluids*, which in process of time *saturate* it, and thus render it incapable of furnishing those plants any longer with wholesome aliment. In fact, *the soil becomes replete with feculent or excrementitious matter;* and on such the *individual plant* which has yielded it *cannot feed:* But it is *not exhausted*; so far from that, it is, to all intents and purposes, *matured* for a crop of a different nature; and thus, by the theory of interchange between the fluids of the plant and those of the soil, we are enabled philosophically to account for the benefit which is derived from a change of crops."

It was thus that I expressed my opinion in 1830, and by the above quotations of two passages from the Gardener's Manual, I think that I have incontestably established my claim to priority. It is stated in the article on M. De Candolle's Theory, (page 324,) that "Brugmans had supposed a portion of the juices which are absorbed by the roots of plants are, after the salutiferous portions have been extracted by the vessels of the plant, again thrown out by exudation from the roots, and deposited in the soil." This may be the fact, nor am I disposed to deny that two men may entertain the same ideas upon any subject, without any intercourse with, or assistance from, each other. Still I assert, that the theory I adduced was, at the time, purely my own; for, I cannot trace in any accredited author, the least hint of the facts alluded to.* Indeed, in a letter received in May last from

* For the theory of De Candolle referred to above—see page 317, vol. 1, Farmers' Register.

* The opinion of Professor Lindley, published in 1832, in his "Outlines of the First Principles of Horticulture," is at page 19, in paragraphs 52, 53, 54, and 55, thus expressed:—

the venerable President of the Horticultural Society of London, that gentleman evinces his opinion of the absolute novelty of the theory; thus, "the continental naturalists have lately imagined that trees emit some matter into the soil, of the nature of excrement, which subsequently proves noxious; but I do not assent to this opinion."

What Brugmans states is in accordance with my theory, and with that now advocated by M. De Candolle; in fact, I do not see how and in what way we can by any possibility support, in *all its* bearings, the theory of the rotation of crops, otherwise than by that of the excretory power of the roots of plants, and the consequent effects produced upon the soil.

I shall now shortly explain what I mean by "*the interchange between the fluids of the plants and those of the soil;*" and then proceed to notice particularly some of the leading facts stated in the review of the new theory.

I have throughout my work maintained that the vital powers of every living vegetable are stimulated by the *electrising principle of light;* by the agency of which, the nutritive substances being about the radicals, are decomposed, and then attracted and propelled into the recipient vessels of the roots. The element so prepared, I consider and designate the "*fluids of the soil,*" which, by the same exciting energy, are, I conceive, carried upwards through the cellular system, till at length they are deposited in the leaves, wherein they are elaborated, and become the vital, nutritive, *proper* juices of the plant. These juices are then, I argue, carried back from the leaves, and distributed in due specific proportions, into cells or vessels appropriated to every required function of the plant; but certain portions are carried to and through the roots, and propelled into the soil; not, however, in the simple bland state of those taken up by the vessels of supply, but imbued with peculiar compound, odorous, and sapid qualities, the effects of the process of elaboration within the vessels of the leaves of the bark. These *exuded juices* I style the "*fluids of the plant;*" and as the processes of supply and ascent, and those of return and exusion, are unintermitting and coincident,—the results of the same mighty electrising principle,—I view and describe them as acting *interchangeably*, as by the law of electric *induction*, whatever is excited *positively* induces a *negative* condition in a body immediately within the range of its energy. It is evident that the vital principle stimulates the decomposition of the previously inert matters of the soil about the roots of plants, and that to a considerable distance, otherwise no food could be introduced into the inconceivable fine vessels of the fibrils. This food is pale, void of taste or odor; whereas the prepared sap, which distributes the nutritious matter to every part of the vegetable, is frequently possessed of color, flavor, and scent, and these to a high degree in many species; and the portion that is carried down to the roots, is found to emit a peculiar and very perceptible odor.

In the present state of electrical science, it will scarcely be denied that a subtile fluid pervades all matter; that it is present in, and perhaps the exciting agent of, all chemical action; and, moreover, that it is the source of all the magnetic phenomena. Will it then be deemed a mere play of the fancy, to suppose that the whole of the processes of the ascent of the raw sap, the elaboration of that sap, its distribution, the exusion of a certain portion of it, are specific electrical phenomena, produced almost instantaneously, and inducing one another? I confess that I see no possibility of otherwise accounting for the agency and effects of vegetable vital action, unless, indeed, we consider the vital principle of plants as resembling that of the animal creation, and consequently as including a sentient and discerning faculty, a power of volition and of choice!

Without dwelling upon an inquiry into the precise nature of vegetable vitality, I shall take it for granted that the vital principle is stimulated by external agency, and that all the functions of the plant are at least *excited* by solar light and atmospheric energy, whereby attractions are produced, and decompositions effected, with regularity and precision, and in an order that is exactly suitable to the constitution of each individual vegetable. With this principle before me, I shall now revert to the hypothesis of M. De Candolle, in connection with, and supported as it is by, the experiments of M. Macaire.

The former philosopher conceives that the true theory of the rotation of crops may be found in the fact, that plants exude more or less of excrementitious matters from their roots; and M. Macaire has followed up the idea by a variety of chemical experiments, whereby he appears to have ascertained that certain plants—one of which was *Mercurialis annua*—took up, by the absorbent powers of their roots, portions of acetate of lead or of lime, which they again yielded to the distilled water, in which the roots were subsequently immersed; and that the fact was proved by chemical reagents or tests best calculated to detect the smallest portions of each of these substances.

"The roots being partly placed in lime-water and partly in pure water, the plants lived well, and the pure water soon showed the presence of lime by the oxalate of ammonia." Oxalate of ammonia is readily prepared by dissolving a portion—say one drachm—of carbonate of ammonia in as much warm rain or distilled water as will take it up in solution. Into this, a quantity of pure oxalic acid dissolved in water is to be dropped, till effervescence ceases, when it may be concluded that a neutral salt is formed. This salt can be produced in crystals; but as this is not required for the experiment in question, I shall not dwell upon it.

The saline neutral liquor being simply filtrated through blotting-paper will amply suffice as a test; and, indeed, it is one of the most subtile tests for the presence of lime in solution that we possess; perhaps one-hundredth part of a grain of lime in a gallon or more of pure water would be detected by it.

With this reagent (and it is one of those which every analyst of the soil should possess himself

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"Spongioles secrete excrementitious matter, which is unsuitable to the same species afterwards as food: for poisonous substances are as fatal to the species that secrete them, as to any other species."

"But to other species the excrementitious matter is either not unsuitable, or not deleterious."

"Hence, soil may be rendered impure, (or, as we inaccurately say, worn out,) for one species, which will not be impure for others."

"This is the true key of the theory of rotation of crops."

of,) the pure water, wherein a portion of the roots grew, was tested, by letting fall a drop or two of the liquid oxalate of ammonia into it; when a milkiness, arising from the union of the oxalic acid of the test with the lime exuded from half of the roots into the pure water, was produced. Such, we may conclude, was the nature and result of one of M. Macaire's experiments, and certainly it is very conclusive. *Oxalate of lime* is an almost insoluble compound; it therefore is manifested in the form of a white powder; the *ammonia* of the test is liberated, and distributed through the bulk of the water.

These chemical experiments are delightful in themselves, and possess very great interest; but, in the present case, an inquiry of greater moment presents itself. Whence came the lime, admitting the fact to be as stated? Nine-tenths of the water of wells, and even of many rivers, contain lime in one form or another, and to a certain extent. But the recital states that one portion of the roots was placed in lime-water, and another portion of the roots of the *same* plant in *pure* water. By this latter term, a chemist understands *distilled*, or perfectly *pure* and filtrated *rain*-water, collected in glass or glazed vessels, as it falls from the clouds. In such water lime will scarcely be traceable; and, therefore, whatever portion was detected in the pure water, must have passed through the media of the vegetable vessels. "Similar results were made with a weak solution of marine salt" (common table salt,) "and with a like result."

The test employed is not stated in the paper, but I conclude it to have been the *nitrate of silver*, because that chemical preparation is one of the most delicate tests for muriatic acid, in consequence of the strong affinity—or rather electro-chemical attraction—which is exerted between that acid and silver whenever the latter is held in a state of solution.

Many other experiments are referred to, and all have tended to prove the correctness of the opinion, that a *rotation of crops is required, in consequence of the excretions from the roots of plants.*

Having thus adverted to a few of the experiments mentioned in the article, I shall now state the facts which led me to the opinion that I formed above four years since, and in which I have been confirmed by repeated subsequent observations. It was notorious that many crops could not be made to succeed, if repeatedly placed in the same individual portions of ground. Manures were found ineffectual; and, therefore, the deterioration of the crops could not proceed from a want of sufficient aliment. The necessity of a rotation was observable chiefly in the farm; still, however, the garden afforded many instances confirmatory of the fact. As I was writing solely upon the produce of the garden, it occurred to me, when treating upon the singular and sudden deterioration of the raspberry, that to the same causes which produced the destruction of a fruit-bearing shrub, might be ascribed the debility that ever followed the successive repetition of a corn crop upon the farm. I had observed that the soil about the roots of raspberries acquired a peculiar color and texture; it differed from that of any other soil of the garden: manure was freely applied, and still the plants became weaker, shorter in growth, and less fruitful. I did not know the age of my plants, because the bed had been formed before I came into possession of the ground; but I really ascertained that plants of the white Antwerp variety, which I purchased and placed along-side of an outermost row of the bed, would not take to the soil; and about the period that the whole bed became almost worthless, I saw several remarkable fine plots of the shrub, and conversed with the owners, from whom I learned a variety of facts, which, though detailed in the plain, unphilosophical manner of cottage gardeners, led me to conclude that the raspberry plant deposited feculent matter in the soil, which, after a certain period, rendered the soil utterly unfit to support the shrub and enable it to produce fine fruit. Reflection and recollection, at the same time, informed me that a variety of vegetable crops imparted a manifest odor to the soil; so much so, that in digging up a crop, the whole plot was perceived to be imbedded with a specific aroma. I confirmed these facts, and then wrote the passages that I have quoted in the early part of this article. Subsequent observations and much experience have confirmed the opinion that I then noted down; so that the reader may rely upon the correctness of the following facts. When peas are sown in pots or boxes, with a view to future transplantation into rows or plots, the vessels become replete with matted roots. Upon removing the peas to their place in the garden, the soil they grow in is found to be completely saturated with odorous matter; it emits a powerful peculiar smell, that cannot be mistaken. The kidney-bean *(phaseolus)* produces a similar effect, but the odor differs from that of the pea: the same may be observed in plants of the leguminous tribe in general; and I have little doubt that this tribe will be found particularly to require a frequent change of situation. I have already referred to a well known effect produced by the pea upon the shallow, loamy soil, of that eastern point of Kent, called the Isle of Thanet; and the experiment of M. Macaire with the bean *(Vicia Faba)* is in accordance with, or at least may be adduced in support of, the facts named above.

The Brassica tribe, cabbage, broccoli &c. also impregnate the soil with a marked and peculiar odor.

From whence do the gases which produce these effects proceed? Many, perhaps, will be inclined to suppose that it is not the soil which gives forth the smell, but the root itself; but how can any plant retain within its substance an odor that is externally sensible? If a flower, a rose for instance, be held at some distance from the nose, the specific aroma of that delightful flower becomes manifest; but could this be the case if the rose did not emit the gaseous vapor which disseminates the odor? Whatever it be that yields odor or scent, whether that be agreeable or offensive, must be material, because it produces a positive effect upon one of the senses; and, moreover, the odor of flowers is very frequently productive of faintness and debility! If the roots of a plant radiate odor, the earth about them, being the medium in which they germinate, must receive the odorific matter; and, in fact, a spade can scarcely be put into a plot of soil that has borne a crop of some vegetables, without liberating, as before stated, a volume of vapor sufficient to be discerned, at the distance of a foot or more, above the surface.

Again, if soil be perfectly fresh, that is to say,

raised from the depth of two or three feet below the surface, it will generally be found of a different color from the old worked soil of the garden or field. A hazel-loam, which is a combination of sand; aluminous and chalky impalpable matter, colored by oxide of iron, is frequently found at the depth mentioned, and may be considered pure virgin earth. If such soil be planted with strawberries, or almost any vegetable crop, its color will undergo a change, and become many shades darker. Is this change of tint effected by carbonaceous matter excreted from the roots, by the decomposition of carbonic acid derived from the air, or by the partial de-exiodation of the ferruginous constituent of the earth? The latter may probably operate to a certain extent, but I hold it more philosophical to conclude that the change in color is to be ascribed to hydrogen gas (holding, perhaps, carbon and other matters in solution,) emitted from the roots into the soil, and therein effecting chemical decompositions by specific elective, or rather electric attractions.

This blackening of the soil may be suspected by some to proceed from the decomposition of carbonaceous matters; and it is highly probable that it does so proceed; but even admitting that manures have been placed in the soil, their decomposition and absorption, according to the received opinion, by the roots of the crop, ought to abstract the carbon from the soil, and not to deposite it therein! But I am supposing a case wherein pure virgin sandy loam, without manure, is employed; and, to simplify the experiment, I say—let a middle-sized garden-pot be filled with such soil, and in it let a single vigorous strawberry plant be placed in the month of February, and be regularly watered; by the end of August following, that is, about the period when the growing season is almost passed, the soil will be found of a deeper color, by many shades, than it exhibited when placed in the pot.

My experience has taught me this fact, and I ascribe the effect to the matter emitted by the roots into the earth. Earth so colored, is not, I conceive exhaused: it is doubtless changed, and in time would be incapable of supporting the vegetation of the plant which had deposited the coloring matter within it, but in respect to mere abstract quality, it is unquestionably richer than it primarily was, having received more than it gave out, and is, in fact, manure for another species of vegetable.

This is in accordance with the very valuable experiment of M. Macaire, which indicates that yellow coloring matter was afforded by the bean to pure water, which yellow matter was *taken* up by "plants of wheat," that "lived well," and afforded evidence of having "absorbed a portion of the matter discharged by the first" (the beans.)

My own reflection, and observation of facts, have satisfied me that certain plants do emit hydro-carbonus compounds into the soil, that poison it, inasmuch as refers to themselves individually; but such experiments, as those of M. Macaire, are invaluable, and ought to be persisted in, in conjunction with daily observations of the soil of the field and garden, till the fact in all its bearing be established. I for one intend, if life be spared to the next spring, to follow the advice given at page 327 of this volume, and to "prosecute those interesting investigations" as far as the means within my command will permit, for they can scarcely fail to lead to important results.

It remains to be observed, that the doctrine of the excretory powers of plants does not strictly apply to all vegetables; at least, it is manifest that *trees* and many *shrubs* will live on, and improve in, the same piece of ground for an almost indefinite period.

Many garden vegetables furnish also exceptions to the rule, and I particularly notice the potato. In fact; the experiment of M. Macaire seems to afford evidence that this vegetable does not secrete matter of any decisive character. I know those who have assured me, that potatoes have been set for ten or even twenty years on the same land, with little or no other manure than coal-ashes and the scrapings of road-sand. This sand was, in the county I allude to, obtained from the calcareous stone of the neighborhood, and it proved a powerful meliorating substance to the cold clayey soil of the district.

I venture to suggest, that grain and other crops, which expend all their vegetative energy upon the production of seed-vessels, are less likely to protrude matter from their roots than other crops which abound with large bulky foliage; they, therefore, cannot prove manure crops for their congenors, although they may render the soil unhealthy to themselves individually. With respect to the potato, I think it evident, that its foliage elaborates much vegetative matter, a large portion of which is expended in the production and support of tubers under ground. These tubers are not the roots proper, but enlarged processes, the depositories of much nutritive matter. It is highly probable, that the plants which produce bulbs, tubers, or spindle roots, whose foliage is abundant or very large, will in general be innoxious to themselves, at least comparatively so, in consequence of the absorbent powers of their bulky root processes. They will in proportion also, be of little service to corn or other crops, unless much manure be previously applied. In a word, the vast foliage which they develope, must claim a great supply of raw sap from the soil. This, or the prepared portion of it, is returned with interest to the roots, but it is then diverted into peculiar channels, and is employed in the production of those processes that constitute so large a portion of the food of man and of cattle. The bulb or tuber-bearing plants are generally but indifferent preparers of the soil for other crops, for they must exhaust its decomposable materials; but they may be grown (though not to full perfection perhaps) on the same ground without becoming diseased. Such, I think, will be found to be generally the fact; and this, as far as the experiment goes, has been confirmed by the observation of M. Macaire.

From all that has been said, it is, I think, fair to conclude that, although plants decompose and take up the nutritive matters of the soil, and render manuring indispensable, yet it is not by exhaustion that a soil is rendered unfit for a repetition of an individual crop. Facts in abundance might be multiplied, in order to prove that a rotation is called for, in consequence of the feculent matter previously deposited affecting the nutritive power of the soil in supporting any individual crop.

ON THE NECESSITY AND MEANS FOR LEGISLATIVE AID TO AGRICULTURE—NO. 3.

[Continued from page 63, Vol. II.]

For the Farmers' Register.

There is another important purpose which might be served by an experimental farm, which is almost entirely wanting in this country—the instruction of *apprentices* to farming. I do not mean apprentices in the common acceptation of that term—but rather pupils, who by giving their time for six or eight months, and their close attention, and manual labor, as well as time, to the business of the farm, might be taught how to perform every operation in the most perfect manner—and which are not learned, and indeed not seen, by most farmers in twenty years, if ever. It would be productive of no less honor than profit to the sons of the wealthiest farmers, who are designed to follow their fathers' business, to attend, and labor at such a school of industry: and to those who are to be farmers on a small scale, with scanty means, there would be still greater advantages, because, they would in the routine of their own business, find but little opportunity of receiving instruction in good husbandry, or of being convinced of what was bad, except by dear bought and slowly acquired experience. The business of a farmer, which requires more varied qualifications to carry on well than any other whatever, is the only one that is generally undertaken without previous instruction or training, and which, it would seem, men are expected to understand by a sort of natural instinct, (perhaps I ought to except the business of statesmen and legislators, which it appears that every man is fit for.) A young man of large landed estate, who expects to derive his entire support from that source, and to spend his life on his farm, and as a farmer, usually passes his whole minority in learning other things in no way connected with the cultivation of the soil, or in idleness—and then commences his business in the most profound ignorance of its details, and with habits altogether unsuited to proceeding either with profit or pleasure. If he has "a turn for farming and management," as we call it, and a natural fondness for the business, he may, and generally will become a good farmer, notwithstanding all these early disadvantages. Indeed, such instances of success are found in men who have lived long in towns, and who were almost entirely unacquainted with the country and with farming, during all the early part of their lives. But whatever such men have done, under their existing disadvantages, would have been much better and sooner done, and with far less waste of capital and labor, if they had enjoyed the means I have recommended for receiving instruction. To poor farmers, the value of such means for instruction, would be still greater, because their close confinement to a very limited sphere of action, in which their circumstances and habits will probably retain them throughout life, would prevent their receiving after instruction by travel, books, or conversation with the best farmers, and personal observation of their labors. To one of those men who practice farming as the agents of others, or overseers, the expense of an apprenticeship, or course of instruction at a pattern farm, would be paid back to him in his next year's wages; and his value to his employers, and as a member of the community, would be soon doubled, unless he was incapable of being improved by instruction.

These observations bring me back to what I endeavored to establish in a preceding number, viz: that the business of the pattern farm might be (and no doubt would be) conducted with a deplorable want of economy and good management—and therefore with loss, instead of profit to the owner, and yet this be no sound objection to the use of the processes carried on, for experiment of their worth, or for the purpose of conveying instruction. If a young man desired to learn how, in the best manner, to plough land under different circumstances—to sow seed regularly—to reap wheat, and secure it well—to know the proper management of a thrashing machine, &c. &c., it would be sufficient that he should find on the pattern farm, suitable land, crops, and implements to exhibit all these operations, and the best laborers employed in executing them—and that he should join in those labors, until he had become dexterous and competent in each process. It would be utterly unimportant to the person thus acquiring instruction, whether the lessons which he received were more costly or profitable, to those at whose expense they were furnished.

Apprenticeships to farming, upon a different plan, have been resorted to with much advantage in Great Britain. Young men who were to be the possessors of good estates, have been proud to assist for months together, in the labors of such distinguished farmers as Dawson, and Walker, and Brown: and at least one of these teachers, (Dawson, who earned the honorable title of "the father of Scottish husbandry,) owed his early lights, and after success, to a like course of training on a farm in a distant region, where the state of agriculture was far more advanced than in Scotland at that time.

In these remarks on farming apprenticeships, I have referred merely to instruction in the labors of agriculture. There is another branch of instruction, the scientific or theoretical, which should not be omitted. This might be derived from a separate institution, as a professorship of scientific agriculture, or perhaps the practical and theoretical branches might be united in a manual labor school. This scheme I should be glad to hear discussed—but as I am not sanguine of success (that is, if any pecuniary profit is expected) from establishments of this kind, I leave the subject to others. R. N.

THE SKINLESS OAT.

To the Editor of the Farmers' Register.

In perusing your valuable journal, I have not been able to see mention made of what is called the "skinless oat;" can you or any of your readers inform us any thing about them? In conversing with an English farmer a few days ago on a visit to Virginia, (who presented me with a spoonfull as a curiosity) he stated that they were introduced into England in 1830 by himself; that they were indigenous of China, and succeeded remarkably well in that climate. Their product is astonishing, being twenty-six barrels of fourteen stone per acre—very hardy and standing their winters. The advantages that this grain possesses over all others of the kind, are when thrashed out perfectly free from husk, fit for immediate use, either for culinary or other purposes, their flavor being delightful, and contains more farinaceous matter than

our oats by three to one. They have produced two crops in England within twelve months; fit for the blade in three months after seeding.

He sent over to a gentleman of New York a few bushels as an experiment the last spring, and as they will show themselves this season, I shall be enabled to hear their result in a few days. If they succeed in our climate, of which I have no reason to doubt, they will be a great acquisition to the Virginia agriculturist. BROOKVILLE.

P. S. Since penning the above, I have received a bill of lading for one bushel sent me, which I shall leave at the apothecary store of Messrs. Grubby & Dudley for inspection, as also a package for yourself at the dry good store of Colton & Clarke, Richmond.

IRISH POTATOES AS FOOD FOR SHEEP.

For the Farmers' Register.

In conversation with a gentleman (who has travelled about a good deal) some weeks since, about managing and raising stock, &c., he told me in travelling in the western part of this state, or in Ohio, some years since, he stopped at an old Quaker's house to stay all night; and while there, he saw some one about the establishment chopping up Irish potatoes, to about the size of partridge eggs. He enquired what the chopped mass was intended for: the Quaker replied, "It is for my sheep: with chopped potatoes and a small quantity of hay, I can keep a flock of sheep fatter, and in better health, than any other way I have ever tried or seen tried."

The gentleman says he saw the flock of sheep before he left, and finer fatter looking sheep he never saw. PHILIP.

CAUSES OF SPELT AND CHEAT IN WHEAT.

To the Editor of the Farmers' Register.

I observe in different Nos. of your Register that a considerable difference of opinion appears to exist in the minds of different correspondents with regard to the cause of spelt and cheat appearing in wheat. An experiment reported to have been made by Mr. Thomas Cocke and yourself, goes far to prove that neither spelt nor cheat is the necessary production of degenerate wheat: whilst others are as firmly of opinion that spelt and cheat are the production of, not only degenerate, but perfectly formed wheat, to which latter opinion, I myself incline, and do not think that the small grains of wheat are more apt to produce either spelt or cheat, than those which are perfectly formed and filled. In both of the instances cited by your correspondents, of spelt having been produced from wheat, the covering was either very slight or none at all; the wheat having been deposited by chance and left in the situation in which it was placed—which want of, or slightness of covering, I think was the cause of the production of the spelt from pure seed. We have not until late years heard or known much of these pests of our wheat crops, and I think the reason is obvious: our fathers were in the habit of turning hogs, horses, and cows into their wheat fields as soon as their wheat was taken off, by which means all, or by far the greater part of the wheat left after harvest, was destroyed, and none left to take root, with almost, or quite no covering, and thus produce these noxious plants. I hope it will not be understood from these remarks, that I am an advocate for grazing our cultivated lands; for I believe very few persons are more opposed to close grazing than I am, but I see no alternative between turning our hogs on our wheat fields which are intended for fallow, and having the spelt eternally annoying us. We could put rings into the noses of these animals and thus prevent their rooting.

Another way in which I think pure wheat degenerates into spelt or cheat is, the manner in which some, if not most, of our good farmers are in the habit of getting in their wheat—which is, ploughing in the wheat after a crop of corn, and dragging after this ploughing, by which, much of the wheat is brought near or quite to the surface, and thus has not sufficient depth to prevent the wheat turning to spelt. I have known one gentleman in this neighborhood pursue the plan herein objected to with *pure unmixed* smooth-headed golden-chaff wheat (the prettiest wheat I ever saw) and the first crop produced from this seed was smartly mixed with spelt—the second had more than double what was in the first crop, and the third (the same seed having been used all three years) had, I really believe, more grains of spelt than of wheat.

I have several times observed in fields which had been in wheat the previous year and the fields not grazed, and not being cultivated the next year, a great deal of *cheat* and some *spelt*—and but in few instances (where I suppose some accident had given the seed left a deeper covering than the most of it had,) wheat the next year. Now, you know that I am a slovenly, as well as a small farmer, and I feel some backwardness in palming my own opinions upon others; but I really think it the duty of every individual to contribute his mite to the general stock of information, experience or observation, to that community of which he is a member—and hope my brother farmers will excuse what may be deemed by some, my temerity in offering to the public my plan of getting in wheat—by which, neither spelt nor cheat has ever *increased* upon me. I have always sown wheat on corn land, except one year, and ploughed it in about three or three and a half inches deep, never using the drag afterwards, which I think, would tend to expose the wheat too near the surface—though I believe that the land being fallowed first, and the wheat sown on this fallow and well dragged in, might obviate this difficulty.

The last fall I obtained my seed-wheat from two different sources: in one parcel there was some spelt: in the product of that part, there was still some. In the other, there was none that I could perceive, and in the product of that, there was not (I think) one head of spelt. In the experiment made by Mr. Cocke and yourself, the grains of wheat though extremely faulty, were deposited at a sufficient depth, and *thereby* the production of spelt or cheat avoided.*

ROBERT BATTS.

Prince George, July 2d, 1834.

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* Our correspondent is mistaken as to this part of the experiment, which he refers to. The grains of wheat were placed in lines slightly traced on the hard surface, and barely covered by sprinkling a little earth over them. The covering was no where more than half an inch deep—generally less.

ON THE SUPPOSED TRANSMUTATION OF WHEAT TO CHEAT.

For the Farmers' Register.

The statement made by a correspondent of Orange county, N. C. at page 60 of the Farmers' Register, is a very fair example of the manner in which many farmers allow themselves to be deceived. The facts were these: soon after a hill-side field had been sown with wheat, a heavy rain washed down some of the loose earth, together with some of the grain, over a strip of timothy meadow at the base of the hill; after which the grain so washed down, grew vigorously; but at harvest, nothing was seen except cheat, and the inference drawn by your correspondent is, that all the wheat turned into cheat. To me however, the chain of reasoning appears to be very defective.

In the first place he has not shown that the seed wheat contained no cheat amongst it; and positive evidence of such fact would be requisite to warrant the conclusion that he has drawn. Now unless extraordinary care and pains have been taken for that express and particular purpose, we have a right to conclude just the contrary; for what farmers commonly call clean seed wheat, has been proved in various instances, to contain from four to more than twenty grains of cheat in every handful. Assuming therefore, as we have a right to do on this occasion, that his seed wheat was not free from cheat, it follows that the whole affair can be easily and satisfactorily explained without referring to the doctrine of transmutation. It appears that the meadow was watered during the winter, which is sufficient to account for the disappearance of the wheat; and the cheat being a much hardier plant, kept the sole and undisputed possession.

He has said indeed that "every bunch [of wheat] proved to be cheat;" but I cannot suppose that he *marked* them; and without closer observations than are generally made in such cases, he would not be able to discriminate between the bunches of wheat and of cheat that appeared in the fall; neither would he be likely to miss the former in the spring.

He informs us that the hill-side was "rich," and this circumstance will assist in explaining why "not a single head of cheat was discovered among the wheat." Cheat though a hardier plant, is generally overshadowed and partially smothered by wheat when the latter is not winter-killed, but grows closely together; and *that weed* under such circumstances, not being conspicuous, is commonly overlooked, so that farmers conclude there is none in their stubbles, when there is more than enough to seed the whole ground. Cheat is a very variable plant in regard to size: I have seen it scarcely four inches high with only a solitary seed on the top, and I have seen it four feet high, with between two and three thousand seeds.

A FARMER.

Cayuga county, N. Y.

TO PREVENT THE SPROUTING OF STORE ONIONS DURING THE WINTER.

Apply a heated iron for a few seconds to the nozzle of the onion whence the roots protruded, and it will be an effectual mode of preserving them.—*Gardener's Magazine.*

ON THE LIVE AND DEAD WEIGHTS OF CATTLE.

From the [British] Farmer's Magazine.

Sir—Having heard much in favor of a work which has recently issued from the press of the Society for Diffusing Useful Knowledge, entitled, *The Farmer's Series*, I purchased that portion of it which treats on British cattle, and on reading it I met with a statement in the first page of the ninth number, of the proportion which the dead weights of cattle, sheep, and calves, bore to their live weight, so completely at variance with every experiment I had made in my endeavors to ascertain their true proportion; and having recently conversed with so many extensive farmers and graziers, and not a few butchers, who had adopted the commonly received opinion that the dead weights were about two-thirds of the live weights of fairly fed beasts, sheep, and calves; that I am induced to lay before the public, through the medium of your valuable and widely-circulated Magazine, a short account of the live and dead weights of a few animals which were weighed either under my immediate inspection, or by persons on whose accuracy I can place implicit confidence.

In laying these experiments before the public, it is not my object or wish to cast any slur on this useful publication, from which I have derived much valuable information, and which, in my opinion, merits a place in the library of every agriculturist; but solely for the purpose of guarding my brother graziers against a disappointment which they will certainly experience, if they weigh their beasts alive before they send them to market, and estimating their dead weights by the rule laid down in this work, expect to receive a price equivalent to those estimated weights.

In the present depressed state of agriculture it is highly essential to every farmer to be able to ascertain, as nearly as possible, the weight of the animal he has to dispose of, so that he may be acquainted with its real value; and the best mode he can adopt to ascertain this is by weighing it alive, which, if an ox or cow, can be done on the machines that are attached to most of the turnpike gates, at a trifling expense. If a sheep or calf—by getting a piece of stout canvas rather more than a yard long, and about twenty inches wide, and sowing at each end a piece of strong wood about two feet in length; from the centre of each piece of wood a small rope is attached—pass the canvas round the body of the sheep or calf, and suspend it by the ropes either to a steelyard or to the arm of a scales-beam, when the weight may be easily ascertained.

I have also found Carey's Scale, which I have used for many years, to be very accurate; I have rarely found it to be 20 lbs. out in the weight of a beast, and often known it to tell within 7 or 8 lbs., and in one instance lately it gave within 5 lbs. of the weight of a heifer of twenty-eight score. As I invariably sell all the beasts, sheep, and calves, which my butcher purchases from me, by weight, and have also the opportunity of measuring those which he purchases elsewhere, and of afterwards seeing them weighed, I have had the means of trying the merits of the scale pretty largely, and can confidently assert, that if the beasts are measured with proper accuracy the scale will give within a few very few pounds of the real weight.

In the statement made in the before mentioned work, they set the average gross weight of marketable beasts at 800 lbs.; whether this average be laid too high or too low is immaterial to our present object; according to their rule, the gross weight being 800 lbs., the dead weight of the carcass, after deducting the offal, will be 550 lbs., or, in the proportion of 13¾ lbs. dead, for 20 lbs. live weight. Now, I consider (and am borne out in my opinion by all the experiments I have made) that from 14¼ lbs. to 11¾ lbs. is the average proportion of fairly fed beasts, and I have no hesitation in saying, that if a lot of beasts, fed to the ordinary state of fatness, were weighed at home, (say 100 miles from London) they would scarcely average 11 lbs. dead weight there, for every 20 lbs. they weighed alive at home. I consider, taking one season of the year with another, that a fat beast of 100 stone will lose 50 lbs. in live weight for every hundred miles it travels.

We next come to sheep and lambs; these they take at an average of 78 lbs. live weight, which according to their rule, will give 50 lbs. dead, or in the proportion of 12½ dead for 20 live weight; this is a considerably higher proportion than I have been able to obtain, those I have made being in the proportion of 11½ to 20, as you will perceive by the annexed extracts from my books.

We will now proceed to examine their statement with respect to calves. They say a calf of 140 lbs. live weight will weigh 105 lbs. dead, or in the proportion of 15 dead to 20; in this estimate I consider them farther from the real proportion than in the beasts or sheep. I have been for some years in the habit of vealing calves, rather extensively, and have fed some as fat calves as most persons, and some which have been allowed to be the best and fattest calves ever seen in the places where they have been killed, and yet, in no instance, did any of them exceed 13 in 20. One, and only one, approached that weight, her live weight being 332, dead 214; she was twelve weeks and two days old, and was a very remarkable small calf, (a cross between the Durham and Devon breeds;) her hind quarters weighed 58 lbs. each, the loins 26, the legs 32; while her fore quarters weighed only 49. When alive, her fore quarters were considered to be fully as heavy as the hind; the difference was occasioned by the extreme size and fatness of her kidneys, which had above 10 lbs of suet on each: she was estimated by several good judges at 45 lbs. a quarter, and bets were made that she would not weigh 47; she had 23 lbs. of rough fat. You will perceive, by the statements annexed, that 12 lbs. is about the average proportion; small calves, if not very fat, will scarcely reach that proportion. In corroboration of my statements, I avail myself of an extract from a letter from Mr. Aiton, on the subject of vealing calves, which appeared in the 23d or 24th number of the *British Farmer's Magazine*, in which he mentions an extraordinary calf whose live weight was 4 cwt. 3 qrs., or 532, its dead weight 308 lbs.—rather less than 12 in 20.

You will perceive by the following accounts of the beasts which I have selected to support my statements, that they were fully fit for any market; indeed, with one or two exceptions, they were much fatter than I should wish for my own use, as the weights of their rough fat, which I have purposely given, will show, and most of them being young, they were as likely to have as little offal as any beasts that could have been selected for the purpose; several of them were either short-horns, or a cross of that breed and the Devon, and were allowed, particularly the two year old,) by all who saw them, to be the best they had ever seen of their ages.

No. 1. A three years old short-horn heifer, of my own feeding, slaughtered in May, 1830, by Mr. Warren, butcher, of Taunton; live weight 1584, dead weight 942, rough fat 116 lbs.; her dead weight was as nearly as possible 12 in 20.

No. 2. A two years old half short-horn steer, also of my own feeding, slaughtered by Mr. Warren, of Taunton, in June, 1830; live weight 1568 lbs., dead weight 924, rough fat 112 lbs.; his dead weight bore the proportion of 11⅞ to 20 live.

No. 3. A three years old heifer, of my own feeding, slaughtered in 1830; live weight 1092, dead 648, rough fat 83 lbs.; her dead weight was about 11¾ to 20.

No. 4. An aged cow, slaughtered in 1832; live weight 952, dead 531, rough fat 79 lbs.; her dead weight as 11 to 20.

No. 5. A two years old Durham and Devon steer, of my own breeding and feeding, slaughtered in March, 1833, by Mr. William Danniel, of Abergavenny; live weight 1428, dead 876, rough fat 140 lbs.; his dead weight as nearly as possible 12 to 20 live.

No. 6. A two years old Durham and Devon heifer, also my own breeding and feeding, slaughtered by Mr. Danniel, of Abergavenny, 10th June, 1833; her live weight 1232, dead weight 708 lbs. rough fat 98 lbs.; her dead weight was about 11⅝ to 20 live. She had been fed on the morning of the 17th of January, when she was dried, and, consequently, was fed on the morning of the 8th of June, the day on which she was weighed before being slaughtered; had she not been fed in the morning, her dead weight would have borne a higher proportion than it did.

These last two beasts were allowed by all who saw them, to be, alive and dead, the two fattest and best beasts of their age ever killed in Abergavenny.

No. 7. A small cow; live weight 630 lbs., dead 356, rough fat 55; about 11½ dead to 20 live weight.

These being all very fat, bore a higher proportion than the average of beasts will do.

Calves, most of them bred, and all fed by me.

No. 1. Calf out of a Durham and Devon heifer, twelve weeks and five days old; live weight 335 lbs., dead 208, or about 12½ to 20.

No. 2. Calf out of a Durham and Devon heifer, twelve weeks and two days old; live weight 332, dead 214, or about 13 to 20.

Live weight, the 5th of January, 1833, was		332
Ditto	16th of October, 1832,	86
Increase in 81 days,		246

No. 3. Calf out of a Durham and Dutch heifer, ten weeks and five days old; live weight 302, dead 181, or about 12 to 20.

No. 4. Calf out of a two years old Durham and Devon heifer, eight weeks and five days old; live weight 242, dead 147, or about 12 to 20.

No. 5. Calf out of a two years old Durham and Devon heifer, seven weeks old; live weight 197, dead 122, or about $12\frac{1}{8}$ to 20.

No. 6. Bought calf, six weeks and five days old; live weight 185, dead 103, or about $11\frac{3}{8}$ to 20.

No. 7. Bull calf out of a yearling heifer, third cross of the Durham bull on Devon cow; live weight 181, dead 116, or $12\frac{1}{2}$ to 20.

Live weight on the 4th of January, 1834,	181
Ditto 30th of November, 1833,	78
Increase in 35 days,	103

This calf was forty days old, and never had any milk except his dam's, who gave more than he could take till he was five weeks old.

No. 8. Bull calf out of a Durham and Devon cow, five weeks and three days old; live weight 218 lbs. dead 135, or about $12\frac{1}{2}$ to 20.

Live weight, the 4th of March, 1834,	218
Ditto 25th January, "	100
Increase in 38 days,	118

This calf never had any milk except his dam's, who gave much more milk than he could take up to the day he was slaughtered. He was killed by Mr. Booker, of Campden, and was considered to be the best, heaviest, and fattest calf of his age ever killed there.

Sheep.

No. 1. In April, before shearing, live weight 172, dead 89; about $10\frac{3}{4}$ to 20.

No. 2. In January, live weight 178, dead 97; about 11 to 20.

No. 3. In March before shearing, live weight 174, dead 91; about $10\frac{7}{8}$ to 20.

No. 4. In August, live weight 162, dead 92; about $11\frac{1}{8}$ to 20.

No. 5. In March, before shearing, live weight 147, dead 78; about 11 to 20.

No. 6. In March, before shearing, live weight 193, dead 99; about $10\frac{7}{8}$ to 20.

Yours truly,

C. H. BOLTON.

MR. BLAMIRE'S EXTENSIVE SALE OF STOCK.

From the New Farmer's Journal.

The recent sale of stock, &c. belonging to W. Blamire, Esq. M. P., was the largest sale that ever took place in the county of Cumberland, and was also the most numerously attended. Early in the day the roads in almost all directions leading to Gaitsgill were thronged with people making towards the sale, which commenced between ten and eleven o'clock. There were, it is computed, upwards of 3000 persons present, many of them from a considerable distance. The arrangements were so well contrived, and every thing conducted with so much regularly, that not the slightest confusion took place. A ring, of about thirty yards diameter, was strongly done about with posts and double rails. Behind which, at the distance of about six feet, were two rows of planks, one a little elevated above the other, the lower about a foot from the ground, and which were densely crowded from end to end. The space between the planks and rails was also occupied by a great number standing on the ground. A large quantity of substantial viands was prepared for the refreshment of the company, of which all might partake that were inclined. Legs of veal, hams, rounds of beef, &c. &c. disappeared in rapid succession, and in the vanquishing of which some performed prodigies of valor. Provision was made for a large attendance, but so much was the influx greater than expected that there was far from sufficient on the first day. On the second day the attendance was comparatively small, and, of course, they fared the better. The cattle were in a field adjoining, which was connected with the ring by a space strongly fenced off on each side, along which the cattle were conducted, and admitted into the ring according to the number in the catalogue. As soon as the auctioneer had knocked down one lot it was immediately driven out by an opening in the opposite side, and another brought in, so that the sale of the second was commenced almost before the other had quitted the ring. The auctioneer (M. Armstrong, to whom great credit is due for the manner in which he performed his part of the business,) was thus kept perpetually employed, and the sale went on with great rapidity. The sale, like all public auctions, was various, some lots being much dearer than others, but, upon the whole, it was considered high. The price of the fat cattle ranged from £9 to £22. Two fat Highland bullocks attracted particular attention, and were knocked down at £63. The price of the calving heifers varied from ten to twenty guineas. Lots 52, 74, and 113, none of which were very strong heifers, were sold, the first for £19 5s., the second for £21 5s., and the third for £20. The advance upon stock of all kinds could not average less than 20 per cent. Many articles which were purchased within the last few weeks were sold at an incredible advance. A number of sheep, which were purchased within a few days of the sale for 23s. 6d. sold at the auction for 33s. 6d.; and cows which were bought for about £14, sold for 20 guineas. Two fat Sutherland bullocks, which had been valued at £20 to £21 each, sold for £31 10s. each. Even the lean stock, (much of which was in very poor condition,) sold at incredible prices. There were about 300 head of cattle in all; but we understand not a few of the goods sold belonged to neighboring farmers.

NEW METHOD OF DESTROYING RATS.

M. Tenard lately read a note to the Academy of Sciences, in Paris, in which he recommends the following as a simple and effectual method of destroying rats. If there be several of their holes, begin by closing them up; those in their most frequented routs will soon be reopened, and in this way their chief resorts will be discovered. Introduce into one of the apertures, (again closing the others,) the mouth of a glass retort, and make it air tight with common luting. Sulphuret of iron is then to be introduced into the apparatus by the tubulure, and diluted sulphuric acid poured cautiously upon it. Sulphuretted hydrogen is evolved, which, entering by the hole, penetrates all the crevices into which the rats may retire, and speedily destroys them.—*Gazette Medicale.*

LOSS AND GAIN.

For the Farmers' Register.

In this communication I propose to examine a few of the disadvantages attending our present mode of making corn. The first inquiry will be, what kind of land is generally cultivated in corn, and how much it produces to the acre. In order to ascertain this, I will first arrange or class the land cultivated in corn under three heads. First, bottom or flat land; second, the best high land; and the third, old or worn out lands. I find some difficulty in saying what portion of the crop is cultivated on the different kinds of land as described; but from observation and inquiry, I will give as nearly as I can, the proportions of each. One-fifth of the land may be classed as flat—two-fifths good high land, and the other two-fifths old or worn out land. The flat usually produces from four to six barrels per acre; the best high land from two and a half to three and a half barrels the acre, and the old land from two to five bushels per acre. From this calculation, as much corn can be made with the same amount of labor upon the one as the other of the two first qualities described, the high land requiring less labor; but the last class will require as much or more labor than either of the rest, having but little, if any vegetable matter to keep the land open and light—and the corn necessarily has to be worked later, as it will not grow off as early. This statement may not be applicable to all parts of the state, but I know that it will hold good in a greater part of the tobacco growing country; that something like two-fifths of the land cultivated does not yield more than one barrel to the acre—which is not more than sufficient to feed the teams whilst employed in making the crop. Is it not a great loss to the farming interest, whilst this is the case, that something like two-fifths of the labor has been spent for nought, and worse than nothing—the horses worn out, tools and land much injured? Would it not be better to keep fewer horses, and let all such lands rest, than cultivate them on those terms? I will leave the settlement of this question to those who are in the habit of cultivating such lands, (and they are not a few) with the hope that they may do it according to the good old rule of *loss and gain* which has gone so much out of fashion these late days.

The idea which prevails in many parts of the country that so much must be cultivated, to the hand, of tobacco, wheat, corn, oats, &c., has contributed very much toward the bringing about such a state of things. Whether the land would bring any thing, or not, it must be cultivated. The overseer was not thought to be worth much unless he could cultivate and keep clear of grass 10,000 hills (or that much space) of each (which was not very difficult on much of our land.) This state of things is owing to the want of a proper application of the good old rule of loss and gain. As I have mentioned the overseers, I would recommend to many of the good farmers and planters of Virginia to work the sum by the same rule in relation to them, and see on which side of the leger the largest sum will stand. I know that this is a difficult subject, and hard to estimate aright. In the general, the interest of the employer and overseer are opposite—more particularly where the crop is divided. The overseer does not feel interested to attend to improvements of any kind, nor is it expected of him: his principal object is to get his reputation up as an overseer, which (in the general) can only be done by making large crops.

F.

ERROR IN PAINTING HOUSES.

Norfolk County, July 1st, 1834.

To the Editor of the Farmers' Register.

I read in a No. of your "Farmers' Register," an article showing an error in the usual manner of mixing paints, by exhibiting the fact, that the quantity of spirits of turpentine added, decomposed a relative proportion of the oil, and thereby left the white lead, or coloring matter, an useless (if not an injurious) powder on the painted surface.* From the able manner in which that piece was written, I was satisfied that the author was master of the subject, and indulged the hope that he would again resume it; but as some time has elapsed and he has failed to do so, I have thought it expedient to make a few remarks on the subject, which, may be of importance to many of your readers.

In order that the object intended in the painting of houses (whether it be the interest of the owner, by preserving the wood, or the comfort of those who inhabit them,) may be attained, it is as necessary that the paint shall be of the proper color, as it is that it shall consist of the proper materials. And if there be an error in using spirits of turpentine in paints, (which I think has been satisfactorily proven by the author of the piece above alluded to,) proof no less satisfactory can be given in support of the assertion that, there is a fundamental and almost universal error in painting the outside or roofs of houses black. That black radiates more heat, and white less than any other color, is a fact too well established to admit of doubt by those at all acquainted with the subject—and it is equally well known that black is quite pervious to the solar rays, while white is almost, if not altogether impervious to them. But should there be one among the number of those who read your work, who for want of evidence doubts the fact, he can with a lens or common sun glass, experiment to his full satisfaction, and in a few minutes remove every doubt. Let him with the glass converge the rays which fall on its surface to a focus, and place them on a piece of white cloth or a sheet of white paper, and he will perceive the paper not in the least affected by them; then let him discolor the paper and use the glass and he will find the paper almost instantly burned. And though the difference of the effects of the solar rays on the two colors may be more striking in the concentrated, than in the diffused state, yet the effect is the same as to the number of rays radiated or rejected. Black radiating more, and white less than that of other colors, it necessarily follows, that houses painted black suffer more, and those painted white less than those of any other color by change of temperature. For, a black roof, by receiving the solar rays which fall on it by day and parting with them by night, undergoes such changes of temperature as will cause the shingles with which it is covered, to expand and

* The article referred to is at page 249 of vol. I.

contract to such a degree, that parts of them on which there is no paint will be exposed to the inclemency of the weather and thereby caused to rot. Nor is this the only evil: for the paint itself suffers from the intense heat in summer; and cracks, as well as the shingles, and admits the water to assist in decomposing the wood—from all which evils white, by radiating less, is exempt. Then if the preservation of the wood is the object to be attained by painting, just so far as black is inferior to all other colors by radiating more—just so far is white superior to all other colors by radiating less. But the preservation of the wood is not the highest consideration with me in giving preference to white over black; it is the comfort of a cool room to sleep in after the fatigues of a summers' day are over, instead of an oven; for on going into an upper room of a low pitched black roof house, a sensation is experienced very similar (I think) to that which one would feel on being thrust into a baker's oven which has been partially heated. Indeed, one who has not realized it can scarcely imagine the anxious restlessness attendant on sleeping in such a room. 'Tis true one may after the labors of a summers' day are over, go early to bed—but not to sleep—he must turn and change from one side of the bed to the other, and search for a place sufficiently cool to enable him to sleep, but in vain, until a late hour, when the temperature of the room shall have cooled down in a considerable degree; then; aided by exhaustion, he falls into a deep sleep, and the room still continuing to grow colder, he becomes chilled, and wakes in the morning but little refreshed, and perhaps with pain in the head, back, and limbs, the premonitory symptoms of bilious, or ague and fever.

I have long been of opinion that many places reputed as being very sickly, owe the character which they sustain in a greater degree to the color which the houses are painted, than to any cause dependent on their local situations. And if the faculty were consulted, I believe it would be ascertained that many cases of disease which have been attributed to miasmata, had their origin in the great change of temperature to which the system was subjected during the night, produced by the great quantity of heat radiated in the day by black roofs. And many cases of disease produced by miasmata, were primarily caused by the same circumstance. The room being at bed time disagreeably warm (and the system thereby much more exposed to the attack of disease) the windows are thrown up to admit the cool air, free access is given to miasmata which enters the apartment, seizes its unguarded victim, and prostrates him on a bed of disease and suffering. If upon examination it shall be ascertained that the foregoing statements are true, it becomes an imperious duty, that all who are laboring under the evils before spoken of, should throw them off by substituting white for black in the painting of their houses: and to the farmer I would say, if it be necessary in order to preserve the wood and contribute to the health and comfort of his family that his dwelling should be painted white, it is equally necessary that his stables should be white, that his horses may have a cool place to stay in after they have done work: and if it be important that his milk and butter should be kept cool and sweet, his dairy should be white, and indeed, I do not know of a house on a farm that should not be painted white in preference to black, as almost every thing raised on a farm, whether it be grain, hay, potatoes or any thing else, keeps better in a regular and moderately cool temperature.

I hope the time is not far distant when this subject will elicit the attention which it merits, and the learned be induced to throw the weight of their influence in the scale, that reason may preponderate, and the fickle goddess fashion in her *sooty* garb be compelled to risk the beam, *light* be restored, and the evil banished.

MATHEW.

ON THE USE OF DUTCH ASHES AS MANURE.

By Mr. JOHN MITCHELL, jr. Leith.

From the Prize Essay and transactions of the Highland Society of Scotland, for 1833.

In a short communication sent to the society some time ago, I endeavored to bring under their notice a very valuable and cheap species of manure, which, on a late tour made by me on the continent, I observed was much prized, particularly in Flanders. I then placed at the disposal of the society twenty casks (about seven tons) of the substance in question, which have been delivered free of any charge to several noblemen and gentlemen, eminent agriculturists, who will have an opportunity of trying their efficiency.

When in Flanders, I found the farmers generally complaining of the serious injury they were likely to sustain in consequence of being almost entirely deprived, from interruption of the communication with Holland, of an article which they considered essentially necessary to their domestic economy, namely, *Dutch ashes;* and as that article can be imported at a very moderate price, it is of importance to consider how far it may be proper to introduce it into this country.

In Holland, there are two kinds of turf or peats used for burning, namely, those cut as in this country from the bogs, which burn easily, but give a whitish kind of ashes, which are of little use; and another kind, more generally used, as being more durable. Having witnessed the mode of making this kind, I shall here describe it. At ditches or ponds made by cutting away the common peats, or upper parts of the bogs, men were employed in dragging from the bottom, by means of long sticks, having hooped bags at the end, the soft portion of the peat under water. They poured it out on the adjacent ground, when the water was allowed to drain off. After exposure to the air, this substance becomes in a few days sufficiently consistent to be cut into pieces of the size of a common building brick, which are dried for use. The ashes from this kind of peat are of a yellowish brown color, and are the kind so much prized in Flanders; carts go regularly round to the various houses where this turf is used, and carefully collect all that can be obtained. When the communication was open with Belgium, the ashes were sent by water to Brussels and other places in that country, and, after a long water carriage, they were often conveyed fifty, and even a hundred miles farther by land.

These ashes are used in various ways in Flanders. They are generally sown upon clover, at the rate of 25 cuvelles per hectare, equal to about 19 bushels per acre, imperial measure. They are sown on clover, wheat, and pastures, in March

and April; on oats and beans in the beginning of May; on rye in October and November. They are also used in gardens with great benefit to the crops, by being scattered over the surface, after the land is sown and raked. They are also good for hops, a handful being given to each plant. When applied to grain, they promote its early growth; but are principally useful in increasing the quantity. They are generally sown by the hand like grain, but care must be taken to leave no part of the surface without its just proportion.

In Holland, the mode of applying them is as follows: In March, the wheat is worked with the hoe between the rows, and sown with clover, and in May, the rows of wheat are weeded. The wheat being reaped, and as soon as the danger of floods is past in the spring, the land is harrowed, and thereafter they strew about 20 imperial bushels on the acre of clover. This practice is greatly recommended, and found to be highly advantageous.

An eminent Dutch agriculturist, F. L. W. Brakkel, in a work lately published by him at Utrecht, points out the advantages of using Dutch ashes on the clover in this way, his alternation of crops being potatoes, rape-seed, peas, wheat, clover and oats. Another writer on agriculture, J. R. Schwarz, says the ashes must be used in their dry state, and thinly strewed, and on ploughed land must be harrowed in before or at the sowing. They are of most use on cold wet grass lands to dry the ground, destroy the acidity, and kill the mosses. They are so much persuaded in Belgium of the great use of Dutch ashes, that the farmers have the following proverb: "He who buys ashes for clover, pays nothing; but he who neglects doing so, pays a double price." The great advantages to be derived from this practice are also pointed out by Sir John Sinclair, in his tour in Flanders; and many other testimonies might be adduced in its favor.

By an analysis made by Professor Brande of the Royal Institution, the contents of the specimen given him were:

Siliceous earth, - - - -	32
Sulphate of lime, - - -	12
Sulphate and muriate of soda, -	6
Carbonate of lime, - - -	40
Oxide of iron, - - - -	3
Impurities and loss, - - -	7
	100

The great advantages which the Dutch ashes hold out to the farmer are, their being a cheaper and (at least for some purposes) more certain and beneficial manure, than any now in use. They can be easily transported to a great distance, they give a greater number of bushels to the ton than bones or rape-cake, and they are only about half the price per ton of either. It has also to be remarked, that bones are getting scarce abroad, and are rising in price. Besides, the Dutch ashes require no previous expense, or preparation in this country, but can be immediately applied after being landed; whereas, bones and rape-cake have to undergo the process of grinding, before they are fit for use.

As a top dressing, these ashes are superior to common manure, it having been found, on making comparative trials in Flanders, that the crops of clover, where the ashes were used, were much earlier, heavier, and superior in every respect to those which had undergone a top-dressing of horse and cow dung. As a top-dressing to the second crop of clover, they will be found highly advantageous, as by being used this way, they wonderfully increase the rapidity of growth and produce. One of the best proofs of their usefulness is the fact, that while we have frequently in this country very backward and light crops of clover and grass, in Flanders, where this top-dressing is used, such a defection seldom if ever occurs. They are therefore likely to be of great use to the farmer on the lands which have "grown sick of clover;" and the importance of having a good crop of clover is the more obvious, when it is considered that, in general, the succeeding crop of wheat is only good when the preceding crop of clover has been so.

Besides fertilizing the land, the ashes may be of great advantage in preventing the injuries arising from worms or insects; and will no doubt be highly useful as a top-dressing, if regularly persevered in for a certain time, in destroying the mosses and lichens so apt to injure the lawns and natural pasture in this country.

I have found a bushel of these ashes to be about forty pounds in weight. The ton therefore, consists of about fifty-six bushels. At £3 per ton, which will be the price from the shop, free of every charge, the expense of manuring an acre will only be about £1—[or $4 80.]

BREAD MACHINERY,

Mr. Cawderoy has patented the undermentioned improvements in machinery to be used in the process of manufacturing bread and biscuits.

This patentee has devoted his attention to every part of the process of bread manufacture; he commences the operation by causing the flour to pass through a sieve, by means of a cylindrical brush, in very minute quantities, and with much uniformity. From this sieve, the flour descends into a mixing vessel, with an inclined bottom. The liquid to be mixed with the flour, to consitute the sponge, is admitted from a reservoir through a pipe near the bottom of the mixing vessel, and the quantity admitted during the process is adjusted to the quantity of flour passed through the sieve, by means of a stop-cock. On the inclined bottom of this vessel, a series of vertical rods, constituting a kind of rake, is made by means of a crank, to move forwards and backwards on the inclined bottom, in a direction at right angles to the inclination; and the apparatus is so arranged, that the quantity of inclination may be varied at pleasure, to suit different qualities of the bread intended, or of the materials employed in its manufacture. The greater the inclination, of course the quicker will the mixture pass off from the rake into the second mixing vessel, placed a little lower than the first, to receive it. This vessel, which has its bottom horizontal, is likewise furnished with a traversing rake, to mix the ingredients still more intimately. The sponge is afterwards returned into the mixing vessels, to have an additional supply of materials to complete the dough, the usual time being allowed for it to rise and fall, to prepare it for separation into loaves and the operation of baking. The dough is next transferred to a press-

ing vessel, through an aperture at the bottom of which it is forced by means of a piston, into a long trough, where it is separated into loaves, by means of a frame furnished with projections of the size of the intended loaves. The frame descends till the dividing partitions cut half through the dough in the trough. The dough is then turned by means of the trough frame, in which it is held swinging on two pivots, and the dividing frame is brought down again to complete the separation of the loaves.

The loaves are then conveyed into an oven on a stage mounted on rollers, and furnished with an endless band of cloth, or other suitable material, by the motion of which they are delivered in succession from the stage upon the oven floor; and when the baking is completed, this stage, with its endless band, is forced into the oven under the loaves, and brings them all out at one time. And thus will be obtained a much greater uniformity of baking than can be effected by the usual method of filling and emptying the oven.—*Trans. Soc. Arts.*

AGRICULTURE IN BAVARIA—ITS IMPROVEMENT BY THE POLICY OF GOVERNMENT.

From the British Farmer's Magazine.

Bavarian agriculture, previously to the first French revolution, was, according to all accounts, less advanced than that of any other state in Germany, and, indeed, remained stationary for ages. By far the greater part of the land in cultivation was the property of the religious establishments; and the capital, Munich, was, as the German name (Munchin) implies, the city of monks. When, however, the estates of the religious establishments were sold, they were chiefly divided into lots so small, that almost every individual who was head of a family became a purchaser. These purchases were made at very low prices, on long credits; and a very great number of them, perhaps the greater number, were agreed to be paid for by the occupant in a terminable annuity; that is, he paid a fixed rent for a certain number of years, after which the land became his own freehold. The laborers who had thus suddenly become proprietors, had, for the most part previously cultivated the same lands for the religious establishments, and, therefore, the external change was, at first, hardly apparent. Every estate, however, abounding in timber and stone for building, and a great part of the country being on a basis of limestone rock, or limestone gravel, facilities were readily afforded for a laborer to enlarge his cottage, and to add to it the necessary agricultural buildings. Scarcely any outlay was required from him but labor, and, as the produce was entirely for his own benefit and for that of his family, his exertions were extraordinary. By degrees, cottage-dwellings, of a somewhat improved description, and small farm-houses and farmeries, appeared in those parts of the country where the soil was richest; not, however, detached, as in Britain, but chiefly congregated together in small villages. The system of culture did not, at first, improve as a system; but, the common operations of the established practice being more carefully performed, better crops were produced. Ultimately, however, the system became improved, in consequence of the operation of the national education that was established when the monasteries were put down, and by the teaching of agriculture and gardening, both by books and examples, in these schools. One of the first consequences was an improved rotation of crops. Almost the whole of the details of agricultural improvement in Bavaria have originated with M. Hazzi, an agricultural writer, and editor of an agricultural journal in Munich. The activity and patriotic benevolence of this gentleman are beyond all praise. It was chiefly through his exertions that a piece of ground was added to every parochial school in Bavaria, to be cultivated by the scholars in their leisure hours, under the direction of the master. In these schools, Hazzi's catechism of gardening, of agriculture, of domestic economy and cookery, of forest culture, of orchard culture, and others, all small 12mo vols., with woodcuts; sold at about 4d. each, are taught to all the boys, and those of gardening, the management of silkworms, and domestic economy, to the girls. Since these schools have come into action, an entirely new generation of cultivators has arisen; and the consequence is, that agriculture in Bavaria, and especially what may be called cottage agriculture and economy, is, as far as we are able to judge, carried to a higher degree of perfection than it is any where else in the central states of Germany; at all events, we can affirm that we never saw finer crops of drilled Swedish and common turnips, or finer surfaces of young clovers, than we observed along the road sides in October and November, 1828. The fences, also, were generally in perfect order, and a degree of neatness appeared about the cottages which is far from common either in France or Germany. These remarks are not the result of observations made, as is frequently the case, from the cabriolet of a public diligence, but from deliberate inspection, and from entering many of the cottages and schools. To enable us to do this, we travelled, every where in Germany, in a private carriage, and never in the dark. We had also, as we have before stated, the advantage, while in Munich, of constant intercourse with M. Hazzi, M. Sckell, and other members of the agricultural society; with the chief engineer, Baader, who had been many years in Scotland; with Baron Eichthal, the proprietor of a large estate, on which he has introduced the Scotch husbandry, and with whom we were acquainted in London; and, with his very intelligent tenant, an east Lothian farmer. The result of the whole of the information procured, and of the observations made, is, that we think the inhabitants of Bavaria promise soon to be, if they are not already, among the happiest people in Germany. The climate of the country will prevent its agriculture and gardening from advancing beyond a certain point, but to that point both will very soon be carried.

So desirous is the government of improving not only the agriculture, but even the face of the country, that they have a standing commission, consisting of counsellors, engineers, architects, and the landscape gardener Sckell, solely for the purpose of devising improvements in the direction of public roads, canals, bridges, public buildings, and gardens, national forests, but, above all, for lining the public roads with trees. These trees are, in some places, in the suburbs of towns, chiefly ornamental; in others they are fruit trees, or mulberry trees cultivated for the silkworm, (a catechism on the management of which is also published by M.

Hazzi;) and, where nothing more profitable or ornamental will grow, forest trees. An extraordinary degree of attention is paid to the mile-stones and to the guide-posts, neither of which are wanting on any road. The guide-posts are generally painted black, with the letters in white or red, the black contrasting better with the snow, which, in some parts of the country, covers the ground for six months in every year. Some of the mile-stones have a bench of stone, forming a plinth or base around them, as a seat; others, where stone is not so plentiful, have a semi-circular area of turf around them, bounded by a bench of the same material, as a seat, and planted behind with poplars or other trees. The neatness with which these turf benches, and the ditches or other fences, and also the grass margins by the sides of the roads, are kept, far surpasses any thing of the kind which we have ever seen in Britain. With us, if any thing of this kind is met with in the public roads, it is chiefly the result of accident, either in the situation or circumstances of the road; or arises from the appointment of a road surveyor who happens to have at once some taste, and more than ordinary facilities for displaying it. In Bavaria the whole is the result of design and system, the entire management of the roads being in the hands of the government. The same ought certainly to be the case in this country; for, otherwise, it is utterly impossible to adopt one general system of improvement.—*Weekly Dispatch.*

PRICES OF IMPROVED SHORT-HORN CATTLE IN ENGLAND.

From the British Farmer's Magazine.

At the Rev. H. Berry's fourth sale of improved short-horns, on the 11th February, 1834, the following prices were obtained:

Lot 1.	2 years old, . .	£24	3	0
2.	Ditto, . . .	36	15	0
3.	Ditto. Bought in.	£45 bid,		
4.	3 years. Ditto.	Ditto.		
5.	3 years, . . .	29	18	0
6.	Calf, sold with the above.			
7.	3 years, . . .	30	9	0
8.	3 years, . . .	38	17	0
9.	8 years, . . .	32	12	0
10.	9 years, . . .	26	5	0
11.	Heifer calf, . .	15	15	0
12.	10 years, . . .	36	15	0
13.	10 years, . . .	48	6	0
14.	2 years old bull, .	39	18	0
15.	1 year old ditto, . .	45	3	0
16.	Bull calf, . . .	15	15	0
17.	Ditto, ...	31	10	0
18.	Ditto, 9 weeks old, .	32	11	0

NEW PLANTS.

Baron Hagal, the Austrian botanist, who lately visited the Neilgherry Hills, in India, declares that the unknown varieties of trees and shrubs, existing there alone, exceed 10,000. The wild rose runs up to the top of the highest trees, and grows to the thickness of four or five inches.—A delicious specimen of orange but not exceeding a filbert in size, is also found there. In the orange valley below Kotagherry, about 4500 feet above the level of the sea, numerous fruit trees are found, amongst which are the wild fig and lemon tree, the latter bearing fruit little inferior in size and flavor to that of Spain.

ON THE CULTURE OF CLOVER.

From the Albany Cultivator.

Few things have contributed more largely to the modern improvement of husbandry, than the introduction of clover in connexion with the rotation of crops. This plant serves to ameliorate and fertilize the soil, and at the same time it affords an abundance of wholesome food for every description of farm stock. Whether cut for winter stores, for soiling in the yard, or fed off by stock, but few crops surpass it in the quantity of cattle food which it affords. Although cultivated in Holland and Flanders from an early period, with great advantage, it was not introduced into Great Britain till the 16th century. At present, clovers enter largely into the succession of crops there, on all soils, and in evey productive course of management. They are principally instrumental in giving to Flanders its high celebrity as an agricultural country, greatly in advance, in improvement, of the states around it. The clover system has converted some of the poorest districts in England, into the most productive and profitable. In the United States it is comparatively of recent introduction; and even at this day its benefits are but partially appreciated or applied as they ought to be. In connexion with gypsum, clover first became a subject of notice and culture in the counties about Philadelphia, and in the county of Dutchess, some forty years ago; and we are much indebted to the example and writings of Chancellor Livingston, Judge Peters, and other gentlemen of learning, wealth and enterprise, for the improvement and wealth which it has conferred on our land. Many of our farmers have yet much to learn, before they can realize the full benefits which it is capable of affording in the profits of the farm. Although botanists enumerate nearly fifty species of the clover family, our present remarks are intended to apply merely to the common red kind (*trifolium pratense.*)

There are three faults in the management of clover which we design briefly to notice in reference to alternate husbandry. Two of these are:

1. *Too little seed is usually sown.* The object of the clover crop is to procure a cheap food for animals and plants. Few if any crops surpass it in the quantity which it aflords of these—and few exhaust the fertility of the soil less. One farmer sows four to six pounds of seed to the acre, and gets in return a thin but coarse crop of hay or pasture. Another sows ten to fourteen pounds, obtains double the burthen of the first, and at a trifling extra expense of less than a dollar to the acre for seed, while his land is doubly benefited by the green crop to be ploughed in. From ten to fourteen pounds of seed should be sown to the acre, whether the object is to benefit the stock or the land. The product will bo somewhat in the ratio of the seed sown; and the advantages of heavy stocking both in the hay and to the soil, will far outbalance the cost of the extra seed.

2. *Clover lays are permitted to remain too long before they are brought under the plough.* The common clover is a biennial, or at most a triennial plant; and if not ploughed under before the third year, its advantages to the soil, as a green crop are mostly, or wholly lost; while after the second year it adds very little to the crop of hay. But if turned under the first or second year, it furnishes to the soil a great quantity of vegetable mat-

ter, the true food of plants. It not only serves as a manure, but it benefits mechanically. Its tap roots penetrate and divide the soil, and as they decay render it friable, and permeable to heat, air, and moisture. A well set clover lay imparts to the soil as much benefit, in our opinion, as ten loads of yard manure to the acre. When a broadcast crop is to be followed by a tillage crop, as corn, potatoes, or small grain, there is manifestly a decided advantage in stocking it with clover, though it is to be turned under the ensuing fall or spring. We estimate its value as manure, to say nothing of the pasture which it affords, at from five to ten dollars per acre, while the cost of the seed does not ordinarily exceed one dollar. I have sown rye and clover, upon a piece of poor sandy land, for which I had no manure to spare, three years in succession with manifest advantage.

LOSS OF WEIGHT IN COOKING ANIMAL FOOD.

It is well known that, in whatever way the flesh of animals is prepared for food, a considerable diminution takes place in its weight. As it is a subject both useful and curious in domestic economy, we shall give the results of a set of experiments, which were actually made in a public establishment: they were not undertaken from mere curiosity, but to serve a purpose of practical utility. 28 pieces of beef, weighing 280 lbs., lost in boiling 73 lbs. 14 oz. Hence the loss of beef in boiling was about 20½ lbs. in 100 lbs.: 19 pieces of beef, weighing 190 lbs., lost in roasting 61 lbs. 2 oz. The weight of beef lost in roasting appears to be 32 lbs. per hundred lbs. 9 pieces of beef, weighing 90 lbs., lost in baking 27 lbs. Weight lost by beef in baking is 30 lbs. per 100 lbs. 27 legs of mutton, weighing 260 lbs. lost in boiling, and by having the shank-bones taken off, 62 lbs. 4 oz. The shank-bones were estimated at 4 oz. each, therefore the loss in boiling was 55 lbs. 8 oz. The loss of weight in boiling legs of mutton is 21 lbs. per 100 lbs. 35 shoulders of mutton, weighing 350 lbs., lost in roasting 109 lbs. 10 oz. The loss of weight of mutton in roasting was 31⅓ lbs. per 100 lbs. 16 loins of mutton, weighing 141 lbs., lost in roasting 49 lbs. 14 oz. Hence loins of mutton lose by roasting about 35½ lbs. per 100 lbs. 10 necks of mutton, weighing 100 lbs., lost in roasting 32 lbs. 6 oz. From the foregoing statement, two practical inferences may be drawn, 1st. In respect of economy, it is more profitable to boil meat than to roast it. 2nd. Whether we roast or boil meat, it loses by cooking from one-third to one-fifth of its whole weight.—*Philosophical Magazine.*

CONJUGAL AFFECTION OF A SHARK.

From the Journal of a West India Proprietor. By the late Matthew G. Lewis.

'As I am particularly fond of proofs of conjugal attachment between animals (in the human species they are so universal that I set no store by them,) an instance of that kind which the captain related to me this morning gave me great pleasure. While lying in Black River harbor, Jamaica, two sharks were frequently seen playing about the ship; at length the female was killed, and the desolation of the male was excessive:—

"Che faro senz' Eurydice?"

What he did *without* her remains a secret, but what he did *with* her was clear enough; for scarce was the breath out of his Eurydice's body when he stuck his teeth in her, and began to eat her up with all possible expedition. Even the sailors felt their sensibility excited by so peculiar a mark of posthumous attachment; and to enable him to perform this melancholy duty the more easily, they offered to be his carvers, lowered their boat, and proceeded to chop his better half in pieces with their hatchets; while the widower opened his jaws as wide as possible, and gulped down pounds upon pounds of the dear departed as fast as they were thrown to him, with the greatest delight and all the avidity imaginable. I make no doubt that all the while he was eating, he was thoroughly persuaded that every morsel which went into his stomach would make its way to his heart directly! "She was perfectly consistent," he said to himself; "she was excellent through life, and really she's extremely good now she's dead!"

WILD ANIMALS OF THE ILLINOIS, NORTH AMERICA.

Abridged from the Illinois Monthly Magazine.

The buffaloe has entirely left us. Before the country was settled, our immense prairies afforded pasturage to large herds of this animal, and the traces of them are still remaining, in the "buffaloe paths" which are to be seen in several parts of the state. These are well beaten tracks, leading generally from the prairies in the interior of the state, to the margins of the large rivers; showing the course of their migrations, as they changed their pastures periodically, from the low marshy alluvion, to the dry upland plains. In the heat of summer they would be driven from the latter by prairie flies; in the autumn they would be expelled from the former by the musquitoes; in the spring the grass of the plains would afford abundant pasturage, while the herds could enjoy the warmth of the sun, and snuff the breeze that sweeps so freely over them; in the winter the rich cane of the river banks, which is an evergreen, would furnish food, while the low grounds, thickly covered with brush and forest, would afford protection from the bleak winds. I know few subjects more interesting than the migration of wild animals, connecting, as it does, the singular displays of brute instinct, with a wonderful exhibition of the various supplies which nature has provided for the support of animal life, under an endless variety of circumstances. These paths are narrow, and remarkably direct, showing that the animals travelled in single file through the woods, and pursued the most direct course to their places of destination.

Deer are more abundant than at the first settlement of the country. They increase, to a certain extent, with the population. The reason of this appears to be, that they find protection in the neighborhood of man, from the beasts of prey that assail them in the wilderness, and from whose attacks their young, particularly, can with difficulty escape. They suffer most from the wolves, who hunt in packs like hounds, and who seldom give up the chase until a deer is taken. We have often sat, on a moonlight summer night, at the door of a log cabin on one of our prairies, and heard the wolves in full chase of a deer, yelling very nearly in the same manner as a pack of hounds. Sometimes the cry would be heard at a

great distance over the plain; then it would die away, and again be distinguished at a nearer point, and in another direction—now the full cry would burst upon us from a neighboring thicket, and we could almost hear the sobs of the exhausted deer; and again it would be borne away and lost in distance. We have passed nearly whole nights in listening to such sounds; and once we saw a deer dash through the yard, and immediately passed the door at which we sat, followed by his audacious pursuers, who were but a few yards in his rear.

Immense numbers of deer are killed every year by our hunters, who take them for their hams and skins alone, throwing away the rest of the carcass. Venison hams and hides are important articles of export. The former are purchased from the hunters at 25 cents a pair, the latter at 20 cents a pound. In our villages we purchase, for our tables, the saddle of venison, with the hams attached, for 37½ cents, which would be something like one cent a pound.

The *Elk* has disappeared. A few have been seen in late years, and some taken; but it is not known that any remain at this time within the limits of the state.

The *bear* is seldom seen. This animal inhabits those parts of the country that are thickly wooded, and delights particularly in cane brakes, where it feeds in the winter on the tender shoots of the young cane. The meat is tender, and finely flavored, and is esteemed a great delicacy.

Wolves are very numerous in every part of the state. There are two kinds; the common, or black wolf, and the prairie wolf. The former is a large, fierce animal, and very destructive to sheep, pigs, calves, poultry, and even young colts. They hunt in large packs, and after using every stratagem to circumvent their prey, attack it with remarkable ferocity. Like the Indian, they always endeavor to surprise their victim, and strike the mortal blow without exposing themselves to danger. They seldom attack man, except when asleep, or wounded. The largest animals, when wounded, entangled, or otherwise disabled, become their prey, but in general they only attack such as are incapable of resistance. They have been known to lie in wait upon the bank of a stream which the buffaloes were in the habit of crossing, and when one of those unwieldy animals was so unfortunate as to sink in the mire, spring suddenly upon it, and worry it to death, while thus disabled from resistance. Their most common prey is the deer, which they hunt regularly; but all defenceless animals are alike acceptable to their ravenous appetites. When tempted by hunger, they approach the farm houses in the night, and snatch their prey from under the very eye of the farmer; and when the latter is absent with his dogs, the wolf is sometimes seen by the females lurking about in mid-day, as if aware of the unprotected state of the family. Our heroic females have sometimes shot them under such circumstances.

The smell of burning assafœtida has a remarkable effect upon this animal. If a fire be made in the woods, and a portion of this drug thrown into it, so as to saturate the atmosphere with the odor, the wolves, if any are within reach of the scent, immediately assemble around, howling in the most mournful manner; and such is the remarkable fascination under which they seem to labor that they will often suffer themselves to be shot down, rather than quit the spot.

Of the very few instances of their attacking human beings, of which we have heard, the following may serve to give some idea of their habits. In very early times, a negro man was passing in the night, in the lower part of Kentucky, from one settlement to another. The distance was several miles, and the country over which he travelled entirely unsettled. In the morning his carcass was found, entirely stripped of flesh. Near it lay his axe, covered with blood, and all around the bushes were beaten down, the ground trodden, and the number of foot tracks so great, as to show that the unfortunate victim had fought long and manfully. On pursuing his track, it appeared that the wolves had pursued him for a considerable distance, he had often turned upon them and driven them back. Several times they had attacked him, and been repelled, as appeared by the blood and tracks. He had killed some of them before the final onset, and in the last conflict had destroyed several. His axe was his only weapon.

The *prairie wolf* is a smaller species, which takes its name from its habit of residing entirely upon the open plains. Even when hunted with dogs, it will make circuit after circuit round the prairie, carefully avoiding the forest, or only dashing into it occasionally, when hard pressed, and then returning to the plain. In size and appearance this animal is midway between the wolf and the fox, and in color it resembles the latter, being of a very light red. It preys upon poultry, rabbits, young pigs, calves, &c. The most friendly relations subsist between this animal and the common wolf, and they constantly hunt in packs together. Nothing is more common than to see a large black wolf in company with several prairie wolves. I am well satisfied that the latter is the jackall of Asia.

Sevaral years ago an agricultural society, which was established at the seat of government, offered a large premium to the person who should kill the greatest number of wolves in one year. The legislature, at the same time, offered a bounty for each wolf-scalp that should be taken. The consequence was, that the expenditure for wolf-scalps became so great, as to render it necessary to repeal the law. These animals, although still numerous, and troublesome to the farmer, are greatly decreased in number, and are no longer dangerous to man. We know of no instances, in late years, of a human being having been attacked by them.

We have the *fox*, in some places in great numbers; though, generally speaking, I think the animal is scarce. It will, undoubtedly, increase with the population.

The *panther* and *wild-cat* are found in our forests. Our open country is not, however, well suited to their shy habits, and they are less frequently seen than in some of the neighboring states.

The *beaver* and *otter* were once numerous, but are now seldom seen, except on our frontiers.

The *gopher** is, as we suppose, a nondescript.

* The writer of this interesting article, appears not to be aware that the *Gopher* has already been described. It belongs to the class Mammalia, order Rodentia, It was formerly included in the genus Mus, of Linnæus, but Rafinesque has given the elegant name of "Geomys." It is the "Pseudostoma" of Say, and the Mus Bursarius of Shaw. There is but one

The name does not occur in books of natural history, nor do we find any animal of a corresponding description. The only account that we have seen of it is in "Long's Second Expedition." In a residence in this state of eleven years, we have never seen one, nor have we ever conversed with a person who has seen one—we mean, who has seen one near enough to examine it, and to be certain that it was not something else. That such an animal exists is doubtless, but they are very shy, and their numbers small. They burrow in the earth, and are supposed to throw up those hillocks which are seen in such vast abundance over our prairies. This is to some extent a mistake, for we know that many of these little mounds are thrown up by craw-fish, and by ants.

The *polecat* is very destructive to our poultry.

The *raccoon* and *opossum* are very numerous, and extremely troublesome to the farmer, as they not only attack his poultry, but plunder his cornfields. They are hunted by boys, and large numbers of them destroyed. The skins of the raccoons pay well for the trouble of taking them, as the fur is in demand.

Rabbits are very abundant, and in some places extremely destructive to the young orchards, and garden vegetables.

We have the *large grey squirrel*, and the ground squirrel.

There are no *rats*, except along the large rivers, where they have landed from the boats.—*Featherstonhaugh's Journal.*

ON THE FOREIGN CORN TRADE.

By Mr. Isaac Dimsdale, London, Editor of the Universal Corn Reporter.

In giving an account of how the corn trade is conducted in different parts of the world, a considerable detail must necessarily be introduced. I shall begin by stating the mode in which foreign corn is obtained.

As the celebrated report of Mr. Jacob is always quoted on this subject as the "highest known authority," I shall probably be deemed presumptuous in expressing my opinion that his report is in many instances *very erroneous*, and I account for it in this way. The letters of introduction, &c. which a gentleman going out on a special mission from the British government would take with him, would be addressed to men of the *highest rank and station*, who, from this very circumstance, could not be supposed to possess a correct knowledge of the details of trade; for if, in this enlightened country, where a nobleman and a merchant are so nearly on a footing in society, it is frequently amusing to witness the singular ignorance displayed by *large landed proprietors* of the corn trade, what must be the case in countries where civilization has not reached to nearly the same height? How could these people in high rank abroad give Mr. Jacob the requisite information? But I attribute the incorrectness of Mr. Jacob's report principally to his ignorance of the German language, the acquisition of which must be indispensably necessary to obtain correct information. People are very jealous of *writing down* aught by which they might commit themselves; but in colloquial intercourse round the table or elsewhere, the most useful hints are occasionally thrown out, where often "more is *meant* than meets the *ear*." Mr. Jacob's not possessing a knowledge of the German language lost him many valuable opportunities of improving the advantages which, to a certain extent, he undoubtedly possessed in a pre-eminent degree.

As *Danzig Konigsberg*, *Elbing*, in fact, *Poland* generally, exports more wheat than any other part of the continent, a short statement of how the trade is carried on at these ports, may serve as a guide to the foreign trade generally. And, in the first place, it may not be improper to mention the mode of cultivation practised in *Volhynia*, one of the principal districts for supplying those markets, and from whence the finest wheat comes.

The population consists entirely of slaves, and either the proprietor farms his own estate, or lets it to what are called "Possessors," at the rate of so much per day's labor, calculated for the peasant; thus the proprietor receives so many day's labor, or rather he receives so much money for each day's labor of the slave. There is a greater number of days' labor imposed on some than others. Suppose there are 1000 slaves on the estate, a calculation is made out of that number how many days' labor they are to perform during the year for the proprietor. A census is then taken of each person and family, which is put into the hands of the "possessor," who exacts so many days' labor from the peasantry, and thus pays so much per day's labor as the rent of his farm to the landlord.

This rotation of crops is followed; 1*st*, wheat; 2*d*, wheat and rye; then barley and oats; and after that the ground lies fallow. The capabilities of the soil are most extraordinary; and some idea may be formed of the number of acres under cultivation, when I state that from Riga alone the following quantities of grain constitute only one year's exportation: wheat, 200,000 quarters; rye, 1,350,000 quarters; barley, 75,000 quarters; oats, 101,000 quarters; and from 20,000 to 25,000 tons of flax, besides the vast quantity of corn which is eaten by vermin, wasted by exposure in stacks, and destroyed for want of a demand. It is no longer, then, a matter of surprise that corn can be produced at so exceedingly low a rate in Poland, Russia, &c.

It was stated in evidence by John H. Lander, Esq. before the House of Lords in 1827, that wheat had been selling in Volhynia at 7s. and 8s. per quarter! but that the proprietors of land would be *well satisfied* if they could obtain 12s. per quarter upon their estates! What do the advocates of free-trade say to this? unless, indeed, they wish to drive all our land out of cultivation to benefit the foreigner.

Taking, then, the maximum price of 12s. per quarter as our guide, we shall see what the wheat will cost, brought to and landed in London via. Danzig. The Prussian and Polish landlord employs a broker to dispose of his wheat at Danzig, for delivery the following spring, generally considered "the 15th of May" in the wording of corn-contracts on the continent; but, of course, this depends on the breaking up of the ice, or, as it is

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species yet known, the *Geomys Bursarius* or *Earth Rat with Pouches*. It is the size of a rat, of a reddish grey color, has deep cheek pouches, which open externally, enlarging the sides of the head and neck. When it was first figured in the Transactions of the Linnæn Society, and in Shaw, vol. 2, part 1; these pouches were represented turned inside out, as though it had been a bag on each side of the head.

termed, "first open water." From the territory of *Volhynia*, the wheat is conveyed down the River *Bug*, which joins the *Vistula*, and thus reaches *Danzig*. The expense of this transport, owing to the great distance, is from 9s. to 14s. 6d. per quarter, making the cost when warehoused in Danzig 26s. 6d. per quarter, or, to use the words of a Polish proprietor, "If I could always reckon on obtaining 26s. per quarter for my wheat delivered at Danzig, I and my neighbors would be perfectly satisfied." The merchant who buys the wheat, either stores it on speculation,—sells it at a certain price, free on board a vessel,—or ships it on consignment to a corn-factor in London, or any other port where he imagines it can be sold to the best account. The expense of freight and insurance varies according to the season of the year, scarcity of vessels, and other causes. At present the rate is only 3s. 6d. per quarter, with 10 per cent. "primage" or gratuity to the master, frequently designated "hat money," and the insurance is 15s. per cent. On arriving in London, the cargo is entered "in bond," unless intended for immediate sale, when the duty is forthwith paid, and the cargo sold and delivered to the buyers direct from the vessel.

If landed, an expense of 7d. per quarter for lighterage is incurred, and about 8d. per quarter city-dues for metering the corn; this work being performed by sworn officers, appointed by the corporation, and who alone can measure grain out of any vessel arriving in the port of London. Several attempts have been made to do away with this *monopoly*, but ineffectually. It is certainly an improper state of things, that a man may not employ *his own workmen to take his own corn out of his own vessel;* but such is the case *in London, and in London only*, I am happy to say.

When the wheat is landed, the granary rent immediately commences at the rate of 5s. per 100 quarters per week. "Turning and screening," should the corn lie long and require it, are 7s. per 100 quarters; and there is, lastly, an expense of about 4d. per quarter *again paid to the corporation* for re-metering the corn out of granary. The expenses of sale in Mark Lane are 1s. per quarter, and 1 per cent. for guaranteeing the debt, *which all London corn-factors do*, they never acting in the capacity of brokers. The credit given is one month, consequently the net proceeds are due in cash one month from the date of sale; but the foreigner generally re-imburses himself by drawing a bill at two or three months' date, when he hands the bill of lading of the wheat for about two-thirds of the probable net proceeds, and the balance is either remitted, or a bill at sight drawn by the shipper for the same.

A good deal of corn is changed against ducats; the ducats are, in general, coined in Holland. The bankers in Hamburg and the bankers in London do the business on joint account; they send those ducats to Danzig and Konigsberg, and against them they get bills upon London, sometimes at two or three per cent., sometimes at one per cent., and through that medium they thus get a market for their bills. The people in Poland generally take gold or ducats; these ducats are in general new Dutch ones, and they go there at a particular value, about twenty-eight guilders.

The next principal market for grain to Danzig, as regards an export trade to England, is *Hamburg*, that being a considerable depot for the corn grown on the banks of the Elbe and neighboring territories. When a sufficient price can be given, barley is sometimes sent to Hamburg from *Bohemia*, in which province some of the finest quality is grown; indeed, it is fit for malting purposes, and always commands a preference in the London market. To the agricultural reader, it may not be uninteresting to learn how tillage is conducted in those districts which are at a comparatively short distance from us.

Instead of a plough in the Duchy of Mecklenburg (to which I shall principally confine myself) an instrument called "hacke" is usually applied. It is merely a broad coulter, somewhat curved at the bottom; hence the tearing up of the soil is not called ploughing but "hacking." In fallowing, the land is hacked four times; namely, in autumn, in June, in July, and the fourth time in September or October. The first hacking is called the stubble furrow; the second, the fallow furrow; the third, the turn furrow; and the fourth, the seed furrow. For barley, which follows after the winter corn, the ground is furrowed three times, viz. in autumn the winter furrow, in April the turning furrow, and in May the seed furrow. For the oats, which follow after barley, the land is hacked twice, first in autumn, called the turn furrow; and the second in May, called the seed furrow. Peas, when sown in the first course after the winter's corn, are furrowed twice; when sown in the second course three times. Beans are not much cultivated; the soil, qualified for their growth, not being abundant in that country. Rape requires five courses, or one time more than wheat and rye. The harrow is applied each time after the tearing up of the soil with the hacke. A good soil is usually harrowed, first with an iron-tined, and afterwards with a wooden-tined harrow. With the latter the land is generally cross-harrowed, that is to say, in an oblique way, on patches of ground of about two rods in width. The rollers are particularly applied in the turn furrow (April) for crushing the clods. Some agriculturists use also the roller after sowing for the purpose of making the soft soil either more solid, or crushing the clods on the strong lands. Others prefer to have the clods that are found in the seed furrows broken by the hands of laborers. On the lands which are neither too loose, nor liable to form into clods, the roller is not generally applied.

A laborer can mow and bind in a day, of wheat $1\frac{22}{100}$ acre; of rye $1\frac{78}{100}$ acre; of barley $1\frac{79}{100}$ acre; of oats $1\frac{99}{100}$ acre. However, the space of land which can be mown in a day, by one laborer, depends very much on the strength of the corn itself; and the expense of mowing ought, on that ground, to be calculated rather in the proportion of the quantity of produce than the extent of surface. The binding is generally done by women, the shocking by men. The rye is usually bound together behind the scythe; the female binder following immediately after the mower, a method which is not practised with the other sorts of grain. On some estates, this mode of binding the rye, close behind the scythe, has been done away with.

The value of 100,000 Mecklenburg roods, equal to $536\frac{35}{100}$ acres of land, of medium soil, with suitable buildings, and sufficient wood belonging to it, is £4082 9 0 sterling. An estate of 1834 acres has recently been sold for 82,000 dollars, or £13,960 sterling, which is in equal ratio to the above valua-

tion. The taxes on this estate amounted to £13 19 10 sterling. On an estate of 1152 acres, I have been furnished with the following particulars of taxation, which may be deemed interesting:—

1. Church-rates, clergymen, repairing the minister's house, and conveyance of materials, - - - - - - - - -	£9	18	2
2. Insurance of the building implements and live stock against fire, also insurance of the crops against hail, - -	17	1	9
3. Repairs of bridges, roads, ditches, and canals, - - - - - - - - -	3	8	6
4. Support of the poor, - - - - - -	7	13	5
5. School tax, about - - - - - - - -	7	13	2
	£45	15	0

The extent of estates varies from 320 to 2850 acres. Such estates are managed in one farming establishment; but there are others of a still larger extent, arising from the annexation of smaller estates to the principal ones.

There is a novel kind of association established, called the "Board of Hypothecation," where each estate has its hypothecation book deposited. In this book all the mortgages with which the estate is encumbered, are inscribed. This system has the effect of giving a full and clear view of the state of incumbrances on the estates. Besides this institution, a *credit verein* (credit association) has been formed, to which a considerable part of the proprietors of the estates of Mecklenburg belong. The estates which thus belong to this association, are mutual guarantees for half the amount of the taxed valuation, when that sum is borrowed upon their security. The directors of this association issue transferable bonds, bearing 4 per cent. interest, but the landholders pay $\frac{1}{2}$ per cent. more, or $4\frac{1}{2}$ per cent., from which the expense of administration is defrayed, and the remainder is applied towards forming a reserve fund.

Wheat can be produced at 25s. per quarter, on an average of late years. I say *of late*, because from the year 1796 to 1808, wheat often sold *there* at 9s. per bushel, and even more! The expense of receiving wheat into store at Hamburg is 9d. per quarter, and the granary rent, so long as it remains there in warehouse, is 2d. per quarter per month. The expenses of freight and insurance are in general about half those from Danzig; sometimes even less. When the traders (who sail at stated periods *full or not*) cannot get a cargo, I have known the freight as low as 1s. per quarter. The other charges are precisely the same as those already enumerated.

Of late years a considerable trade has been carried on with *Odessa;* but the immense distance will always militate against a very large importation direct from thence. Much business has, however, been done by means of shipping to Malta, Gibraltar, &c. taking out and cooling the cargo, if requisite, and then reshipping it for England.—As some may not know the meaning of "cooling," it is necessary to state, that many cargoes have been so heated on the voyage, as to render the pick-axe necessary to get the wheat out of the ship's hold and in several instances the whole has been thrown overboard by permission of the Board of Customs, or burnt for manure, as it would have endangered the safety of the warehouses, from the intense heat which it engenders; for, even spreading out heated corn on a floor three or four inches thick will not cool it. Independently of the length of voyage from Odessa, there is another circumstance attending the trade there, which forms a considerable impediment to it, namely, that the money must be advanced to the growers before harvest, or they will not send it down to Odessa, the expense being so heavy, and the confidence in that country so little; but I believe the merchant is mostly the sufferer, as the farmers frequently pocket the money, and never send the wheat.

I should mention, that a good deal of wheat is shipped from Odessa to Malta, where it is landed and stored in the *Rock*, and then hermetically sealed, the advantages of which are these, that any worm in the wheat rises to the top and dies; and if the wheat is put into the Rock in good condition, whenever it is removed the condition will be equally sound, and the expense of keeping it is only one per cent. per annum. In case of any demand arising, the wheat is within a reasonable distance, and can be forthwith shipped off, which is of course a great convenience to the owners.

Having thus given a summary statement of how foreign corn is cultivated and sent to England, it may not be uninteresting to many to know a little more of the details of the trade. And, in the *first* place, to describe how grain is brought from the interior to the shipping ports. In Russia, Prussia, Germany, Poland, &c. where the estates lie contiguous to rivers, the corn is sent down them in flat-bottomed barks or barges; but the navigation is frequently very dangerous, and at all times precarious. In winter, the rivers are subject to great inundations on the breaking up of the ice; and in summer they are sometimes quite unnavigable for want of water. These causes, preventing supplies from coming to market, occasionally produce a considerable advance in the prices. The river Dnieper has many cataracts and shallows, so that barks can pass for a very short period only in the spring, and those only of a small size. Consequently most of the corn that goes to Odessa is sent in carts, carrying about 5 quarters each. These carts are drawn by oxen, and they travel in parties of 100 to 150. The oxen are pastured during the night, and they take advantage of the time when the peasantry are not occupied with the harvest; so that the proprietors can send their wheat 300 or 400 miles at a very trifling charge. *These districts might be cultivated to almost any extent, should an increased demand for grain arise, and the soil is what is termed "virgin land," requiring no manure whatever.* The wheat is generally dried in the sun at Odessa, before shipment, which is a far preferable mode of drying, in respect to that grain, to kiln-drying; but, as I have before mentioned, even this will not entirely preserve it from heating, for I never knew a cargo to arrive direct from thence without sustaining more or less injury on the voyage, which is the reason why the Mediterranean ports are made depots for Odessa wheat. From the Baltic ports corn is generally shipped from May 15th to the end of October, and sometimes later.

As respects quality, the finest wheat in the world is grown in *Volhynia*, and shipped from *Danzig*, *Elbing*, or *Konigsberg*. The peculiarity of this wheat is the little bran it yields, which makes it much sought after by the English (but more especially by the London) millers. It possesses, like-

wise, a surprising degree of whiteness, and yields more *farina* than any other sort of wheat, not excepting the finest Essex or Kentish. This superior description is denominated "fine high mixed;" almost all the Danzig wheat coming *mixed*, in proportion to the quantity of *red* wheat, so much lower are the quality and value of the article. The general proportion of ordinary runs is one-third white to two-thirds red. The different denominations are, "finest high mixed;" "good and fine mixed;" "ditto, adapted for Scotland and north of England;" "red mixed," and "ordinary and light;" the first weighing from 61 lbs. to 63 lbs. per bushel, and the latter 56 lbs. to 57 lbs. per bushel. The difference in price varies from 10s. to 15s. per quarter.

In the Mediterranean, there is some very fine white wheat grown, both "soft" and "hard." A considerable importation took place from Genoa, Naples, &c. a year or two since, which was freely purchased by our millers, at high prices; but this description of grain is principally used for making *maccaroni* in Italy and France, and is not exported unless a better price can be obtained for it elsewhere, which is not generally the case.

The most inferior wheat comes from *Riga*. It is extremely small berried, of a dingy red color, and full of little black seeds. There is, however, some of better quality, but the generality is of an inferior description, and the price obtained for it is proportionally low, being 10s. and 15s. per quarter, under the finest *Danzig*.

There is occasionally an import of wheat from *Canada*, the *United States*, &c.; but the supply principally comes to Liverpool, and in the shape of flour, of which a very large quantity annually arrives. The duty on wheat from the British colonies is only 5s. per quarter, and on flour 3s. 6d. per cwt.

During the present year, I had a consignment of wheat from Van Dieman's Land, the quality of which was very superior, as may be supposed, when I readily obtained 8s. per bushel for it. I should, however, remark, that a portion of it which was sown on one of the finest farms in Bedfordshire, would not grow; and I am informed, that scarcely any wheat was ever known to vegetate in this country that had crossed the line, unless particular care be taken to preserve it from the effects of the atmosphere.

The best red wheat comes from *Stettin*, *Rostock*, *Wismar*, &c. This grain is very like English wheat, and when it arrives in good condition, is much esteemed, especially when we are visited with a "dripping harvest," it being then almost indispensably necessary to mix with our new corn, in order to render it fit for grinding.

The finest barley comes from *Bohemia*, *Silesia*, and the banks of the *Saale*, by which river it is transported to the *Elbe*, and thence to *Hamburg*. This barley will frequently malt as well as English; but nearly all other continental descriptions are only fit for grinding, being mostly of very light indifferent quality. The greatest quantity is grown on the *Danish* islands; but there is a good deal shipped from *Danzig* and *Konigsberg*. Its value at present in those ports is 12s. 6d. to 14s. per quarter.

Beans are not cultivated to a great extent; but from *Denmark* a tolerable quantity is annually exported, the quality being pretty good. They are generally of the harrow-tick description; but sometimes "Heligoland" or small pigeon are exported, which obtain high prices. The *Egyptian* beans are of a very peculiar red color, occasioned by the intense heat to which they are exposed when ripening, in addition to which they generally become very heated on the voyage, insomuch that whole cargoes have been totally destroyed. They were formerly an article of great speculation; but the consumption of beans has much decreased of late, in consequence of the comparative cheapness of oats; so that very few are now imported direct from *Egypt*, but occasionally some come from *Leghorn*, *Marseilles*, &c. where there are magazines of them, as of *Odessa* wheat. Their value in those places is at present 16s. per quarter.

Although we were originally indebted to *Prussia*, it is supposed, for our best stock of blue peas, the cultivation of them is not now carried to any great extent, but we occasionally get from thence some fine white boiling peas. Their present value is about 21s. or 20s. per quarter, free on board.

Rye is grown to a very great extent in *Poland*, principally for home consumption; but there is likewise a considerable export trade, chiefly to Newcastle, where a large quantity is annually used, the quality being generally very fair:—present shipping price, 20s. to 22s. per quarter.

Buckwheat, or brank, is grown to some extent in *East Friesland*, *Denmark*, &c. and was formerly much esteemed here for distilling purposes; but *barley* has latterly been so extremely low in price, that the distillers have preferred purchasing this grain on the spot, to incurring the risk of a voyage in importing *buckwheat*. This grain may now be purchased at *Hamburg* at 16s. 6d. to 20s. per quarter.

Tares are shipped in quantities from the *Danish* islands, where they can be produced at a very reasonable rate, say 15s. to 17s. per quarter.

The finest heavy Poland and potato oats are grown in *East Friesland* and *Holland*. What are termed the "*Dutch Brew*," oats seldom weigh less than 41 lbs. to 42 lbs. per bushel, and often much heavier. The *Archangel* oats are of quite a different description, being extremely thin skinned, sharp, long, and of a bright yellow color. Post and coach masters are very partial to this corn, as it has little husk. *Riga* and *Petersburg* oats are somewhat similar, but they do not generally weigh so heavy as the Archangel, neither are they so bright. The cause of this brilliant yellow color, is the intense heat of the weather during harvest. In France is grown a peculiar grey-colored oat; but generally much corn is not exported from that country, as they consume their own growth. Occasionally, however, great quantities have been sent over, for I never yet knew foreigners refuse to ship corn to this country, if they could only obtain a good price for it. They will live on husks or any thing, and part with nearly all their grain; *but only for a consideration*. *John Bull*, on the contrary, will have a belly full of the good things of this life; at any rate he goes upon short allowance with a very bad grace.

The manufacture of *oil cakes* is carried on to a great extent in *Germany*, *Flanders*, *France*, and *Holland*, from whence the English graziers and farmers are principally supplied; indeed, occasionally, the English crushers import foreign cakes, and *re-press* them through their own mills, extract-

ing a considerable portion of oil therefrom; and then they form them into a "town made shape," and sell them as "home manufactured," which, in point of fact, they really are.

To conclude this outline of the manner in which corn is produced abroad and shipped to this country, it remains only to remark, that all the principal shippers of corn in the Baltic are also ship owners; consequently they keep their vessels employed in transporting grain, seeds, or oil cakes, which they do at a more moderate freight than an English captain will engage for. But so much more esteemed are an English master and his vessel, that frequently more freight is paid them by the merchant here in preference to shipping in a foreign bottom. The Englishman will frequently make the voyage in half the time that a foreigner can, and sometimes even arrive before, or as soon, as the bill of lading, and thus save the expense of insurance, which, from the distant ports, is frequently very heavy. If I made a choice, I should always prefer Scotch captains; they are generally shrewd, pushing fellows, and I need not say how much dependence may not be placed on an active, honest, and clever master of a vessel to go a long voyage to a distant port, where the purchaser of a cargo is at the mercy of a man many miles distant, who, as he takes care to get paid for the corn before it arrives, is not always very particular as to its quality. * * * *

I believe I have now touched on all the topics likely to interest the general reader, but before concluding, I will take the opportunity of redeeming from disgrace a most useful part of the community, I mean "*the speculators in foreign corn*," who are too frequently held up to public odium. In *Sweden*, *Prussia*, *Spain*, *Denmark*, *&c.* magazines or storehouses of grain are obliged to be erected in different places, in order to guard against bad seasons. In *Spain* alone, there are upwards of 5000 of those depositories (denominated "*positas.*") Every occupier of land is obliged to bring a certain quantity of corn, proportionate to the extent of his farm; the following year he takes back the corn he has thus deposited; and replenishes the empty garner with a larger quantity, and thus he continues annually to increase the stock by these contributions, called "*cresus*," till a certain measure of grain is deposited; then every one receives back the whole corn which he has furnished, and replaces it by an equal quantity of new corn. Whenever a scarcity happens, these repositories are opened, and the corn dealt out to the people at a moderate price.

In some places, seed corn is distributed to necessitous husbandmen, who are bound to restore as much in lieu of it the next harvest. The institution of such a system as this, is no doubt highly necessary in a country only in an imperfect state of civilization; but that which requires the authority of government to accomplish abroad, is in *England* brought about by less questionable means. The commercial and enterprising genius and spirit of our countrymen, induce them to enter into speculative purchases, and risk the investment of their capital in grain at one period, with a chance of reaping a profit during the deficient season that may succeed, and thus the supplies of a good season and a bad one, are in a great measure equalized to the consumers. In the ruder states of society speculators in corn are the objects of popular hatred, when, in fact, they are amongst the most serviceable members of the community; but for their operations, the people must either incur the chances of famine, or the clumsy machinery of government be resorted to. In offering these remarks, I do it solely from a sense of justice, as I myself do not belong to this class of individuals.

THE FIRE-SIDE REFLECTIONS OF A BUCKINGHAM FARMER, ON AGRICULTURE.

From the Virginia Farmer.

Our ancestors came to this country to acquire good lands and realize independent fortunes—to obtain the first object was easy, but the attainment of the second, required activity and labor. Extensive and unreclaimed forests, a virgin soil of great fertility and a congenial climate, admonished our forefathers, that the cultivation of tobacco would be profitable. Land being abundant and cheap, it was not to be expected, that an enlightened system of agriculture would prevail, and but little effort was made to improve or preserve the fertility of the soil. To clear the forests, make tobacco, so long as the land would produce the article, then plant corn, plough it up hill and down, and in a few years convert the field into a common, was, in short, the practice of our ancestors. When land could, as then, be purchased for a trifle, they perhaps did not act very unwisely. Men of intelligence and wealth entrusted the management of their estates to overseers, and those in middle life, instead of superintending their own farms, obeyed the dictates of vanity and they too employed overseers. Thus to a great extent, the land and labor of the country, were under the control and supervision of a class, (I do not mean all, as there are honorable exceptions) who were then, and are now, as ignorant and self-conceited, as they are avaricious and obstinate. Each succeeding generation, unmindful of the fact, that population was increasing and that land would necessarily appreciate in value, reverencing the habits and usages of the previous one, pertinaciously adhering to the same system, and deriving no instruction from the improvements of other countries or the sad experience of past times, has persisted in this plan of exterminating the forest and devastating one of the fairest portions of the civilized world. Now that our farms scathed with gullies and studded with pine thickets, and presenting other indications of poverty, our citizens becoming dissatisfied with the state, because they cannot go on to make tobacco, corn, and wheat as heretofore—are lasting evidences of the impropriety of our management—the almost entire change in the aspect of our land and situation, in connexion with the great importance of an alteration in the mode of conducting our agricultural affairs, calls for mature reflection. The system, that at one time might have been profitable and called for by the situation of the country, inasmuch as the land was mostly in woods and selling for a mere trifle, may be ruinous under a different state of circumstances. Whether our situation in an agricultural point of view, and the objects to which our attention should be called, are not materially different from what they might justly be considered some time back, I shall leave to others more fully to discuss, but that this is a critical and important crisis to the planters and farmers generally, and those whose

interests are intimately connected with and must participate in their good or bad condition, is so apparent, that I think few will be disposed to question the assertion, much less to attempt its refutation.

The present depressed condition of the state is attributed to a variety of causes, by different persons. One will charge it to the tariff—one to the banks—another to the want of roads and canals—a fourth to tobacco-making—and a fifth to slavery—but very few will own, (I know none that have) that they are or have been, amongst the many causes, or even connected therewith. It is almost always ascribed to something, or some one else. That all these causes have had more or less effect, I shall not attempt to disprove, but as it is more easy generally to give a theory than to prove one to be incorrect, I shall content myself by stating my views on the subject, which are as follows: Is it not much more reasonable to attribute by far the greater part of our grievances and misfortunes, to our own bad management in reference to agricultural matters, and to the fact that men of talents and wealth are, and have been, too much disposed to exchange the simplicity and "*otium cum dignitate*" of the farmer, for the intrigues of office and the allurements of political distinction; as well as to the custom of estimating their wealth more by the quantity of land and number of slaves, than by the fertility of the one, or the profitable employment of the other? We all know that the lower class in society, ape the higher—let the latter be negligent, luxurious, and reckless—giving to a third or fourth person to do, what they should personally attend to—manifest an aversion to engage actively in agricultural pursuits—leave their farms and domestic concerns, in the hands of ignorant agents, with every inducement to conduct business entirely with a view to present profit, regardless of future consequences—and it would require no great length of time for the same spirit to pervade society generally—and the consequence would be, that the same state of things would be induced, as we have at present. But suppose a different course to be pursued by the better informed and more wealthy people, and that they had not suffered themselves to be idle spectators, on the one hand, or aspiring politicians on the other. (I mean in the general)—and, that they had acted the part of good stewards over the commonwealth, and have taken as much interest in teaching by example in the field and with the plough share, as on the floor of legislation. Would it be an overstrained deduction, to infer in that case, that the condition of the state, would be the very reverse of what it is at this time—probably with a high degree of agricultural improvement, we would have been enabled to have retained our population, increased our wealth and standing in the union, and by our thrifty condition attracting talents from one quarter, and wealth from another, Virginia might have been spared the reflection, much more the mortification of being jeered about her declension from the high stand she once occupied in this republic. Of one fact there can be but little doubt, that with all the advantages in the world we need never calculate on succeeding well, without good management, economy, and personal attention to business, and this is equally as true when applied to farming, as to other concerns of life—but with these latter requisites in conjunction with our other advantages, we can achieve wonders, and combat successfully, a host of opposing elements. I know some farmers who go to the bank for money—some who supply their families in foreign goods—others far removed from improved roads and canals—and others who own many slaves and make tobacco—all have been and are improving their estates, and accumulating wealth by judicious management and wise economy, as fast as most prudent men need wish, notwithstanding all these drawbacks.

In giving my views, however, I do not intend to assume, that the opinions of others are wrong, and my own only, true—it is enough for me to indulge in a little speculation, ending in the conviction that whether the disease has been ascribed to the proper causes or not, that one fact is undoubtedly true, that our country is far from being in a prosperous condition. With this conviction, I am not very solicitous to know the causes which produced this decline—while the evil is apparent and demands a prompt and efficient remedy. Individuals can, by a combination of efforts, applied to different pursuits, all more or less converging to one grand object, do much towards relieving the state from its difficulties. That system which, in adding to individual wealth and happiness, will equally promote national prosperity, without legislative interference, eminently deserves a thorough consideration—and the more especially when the fact is so notorious that the people prefer a plain and cheap government, and one that will interfere as little as possible, in the control and regulation of their labor.

An observing eye, in glancing over the state, though it may see much to criticise and to deplore—yet must perceive, that in our agricultural operations, a revolution has commenced and is progressing, which if vigorously prosecuted for a few years, will materially improve its appearance. Taking this for granted, may we not expect, that with the aid of our talented men, a judicious developement of our physical advantages, and a proper application of our domestic energies, we would be able yet to obtain that high degree of perfection, in an agricultural point of view to which our climate and soil entitle us. A great poet remarks, that "there is a tide in the affairs of men which when taken at the flood leads on to fortune," and now that the current is changing, it is much to be hoped that Virginians generally, would redouble their efforts, and by their conduct proclaim, that if the "Old Dominion does not overcome her embarrassments and stand first among the foremost, that she shall go down with colors nailed to the mast." Let us only come to the determination, and by our acts evince our desire to carry on an agricultural reform. Let us, by holding out inducements, endeavor to attract public attention to the subject. Let the farmers, convince their sons, that honor and wealth can be as successfully obtained in agricultural pursuits, as in either of the learned professions. Let the farmers read and profit by the experience of other countries and other times—let them have their clubs or societies and *agricultural papers*, and who would be so skeptical as not to be convinced with all these assurances, that our march would be onward?

As I have indulged in the flattering assertion,

that a change in our farming business, is taking place for the better, it may not be amiss to cite some of the evidences upon which I ground my belief—several of which I will now briefly mention. A farmer and planter in our vicinity who conducts business on a very large scale, is now setting us in the management of his farms, a useful and valuable example, and so far as he is concerned, it is highly profitable, while it gives full scope to an industry and sagacity, of which but few can boast. Strangers would be astonished at his rapid progress annually, in improving his farms, by manuring largely, clovering and plastering, in connexion with skilful management, while at the same time, very large crops are made.

He has given a practical illustration of the fact, that an extensive and judicious system of improvement, is by no means incompatible with great annual profits; and that the expense and labor of improving is amply repaid by the additional productiveness and increased value of the land. Another neighbor is devoting a portion of his time and capital to raising the most improved breeds of cows and sheep—and I dare say, that no one who has seen his stock can think them unworthy of the attention either of the proprietor, or of the public. The introduction of such animals will be highly advantageous to our section of the state, as well as creditable to the liberality and enterprise of the intelligent and worthy gentleman, under whose auspices they were introduced. A third gentleman has been for several years past, enjoying all the luxuries which a spacious garden, containing a very great number and variety of the most choice fruits and vegetables, selected from all quarters of the union can afford. It is true, his garden could not be compared either with a green-house establishment, exhibiting splendid trifles, and foreign plants of every latitude, fantastically arranged to please the eye or regale the senses, or with Prince's noted collection, but it is such an establishment as would be a valuable appendage to any farm, indicating at the same time, the good sense and taste of the proprietor. Such persons as those above alluded to, combine the "utile et dulce," or to give it a farmer's version, they can *work and talk* too. They have done, and will do more towards advancing our permanent interests, than a small host of pseudo-politicians; and the public countenance should make it manifest, that such evidences of good management and laudable enterprise, though they may not elicit songs of praise, yet that they are viewed with great satisfaction. I have heard many very good planters say, they had rather improve a piece of tolerable land, than clear the same quantity even for tobacco. Now this, a few years ago, would have been thought rather singular, but it seems we are now finding out, that it costs about the same labor to make good land first rate, that it does to prepare the like quantity for cultivation. This I consider a great point gained. Our cultivation is better than when I could first recollect—we have less surface work, less ploughing up and down hills—but we are deficient in many things yet—that is about the depth of turning lands—the propriety of breaking all lands deep—the advantages of coulters, and the best time and method of preparing lands for different crops—also, the most judicious method of making manure—whether it would not answer as well to use most articles as manures previous to their undergoing partial decomposition in the farm pens, and whether a top dressing, or the usual way of using manures, is most advantageous? The plan of having farms divided into from four to five fields, and a more frequent rotation of crops, seems to be more generally pursued. A rotation of crops, I have no doubt, could be carried to a much greater extent, and with greater profit, than most persons are willing to believe. Many instances have been recorded, of fields being cultivated in various crops in quick succession, and of their rapidly improving. Our farmers would do well to investigate this subject. Probably almost as much depends on a quick and varied succession of crops, as on skilful cultivation or manuring. To ascertain in our climate and soil, what crops succeed best after each other, is not unworthy of notice, as we have all seen more or less of its effects, and it may not be unreasonable to suppose, that some crops would be to their successors almost as a coat of manure, by the superior condition in which they leave the ground for their propagation. The propriety of cultivating less land, and of having that good, is, I think, daily gaining ground, and in fact most of us appear for a long time, to have thought, that to make crops, a great deal of land must be cultivated, even if it was rich, but if poor, then an enormous quantity. We seemed to have lost sight of our reason, and to look only at the land and the crop we wished to get, without taking into consideration the labor and the best plan of applying that to produce what we wanted. Most persons are willing to admit, that a small crop well worked, is better than a large one half worked, or that one acre of rich land will produce as much as two of common. Now would it not be best in good land to lessen the crop, and to spend a part of the labor which would be used in the cultivation of two acres of poor land, and make one rich, and then get the crop? Suppose, for example, you take fields instead of acres—say a farm with four fields, sub-divided into eight—say you improve one of these small fields every year; in eight years your farm would be rich—then you could go on to double and treble what you formerly made.

It is true, in the commencement, these things will be on a small scale, but every year they are gaining, and this annual addition will increase so rapidly, that before many years have past by, a person's means of improving will comparatively speaking, be almost without limit. We all remember a sum in arithmetic, about a smith's undertaking to shoe a horse, for the first nail, a certain price was to be given, and for every other nail the price was to be doubled, and the prodigious sum it amounted to. Apply this to a judicious method of improvement, and I dare say, it will not be very deceptive; if the result would not be so great, it would at least be most astonishing. The great barrier, which prevents most persons from readily giving into this plan, is their not having matters so arranged, as to be able, with tolerable convenience, to make a commencement. This it is true, will at first require some additional labor, and a little extra expense—but is it not most wise at this particular juncture, in the management of our affairs, to take a prospective view and conduct them accordingly, and lay aside for a season our great eagerness for present profits—the more especially as it is very questionable whether

our ideas about present profits are not based more in imagination, originating from the distorted medium through which we view the improving system, than upon the facts which some farmers are illustrating, or the logical deductions of distinguished agriculturists? Would not some of our farmers, who have many laborers, and a large quantity of poor land, do better to subtract a part of the former from their usual plantation employments, and have them engaged in improving their farms? That some capital at all times can be profitably employed in improving, but few will dispute, and we all know that a great deal of labor is yearly expended without any thing like an adequate profit, on account of our lands being poor—and it is equally well known, that labor is as cheap here, if not cheaper, than in most of the states—and it is also equally as plain, that if our lands were rich and productive, that this state would be the first choice of most persons, much less Virginians—and that our lands would sell as high as any in the union.

Now with all these facts before us, does it not appear as clear as midday, that this is the most suitable time to alter our operations—and that improvements can be made here at as little cost, and with as much expectation of profit, as any where in the union? Is it not as praiseworthy and as profitable to convert barren wastes into verdant fields, as to fell the lofty forest, and to expose its virgin soil to rude cultivation for a few years—then to neglect, and finally to ruin? That man is considered more deserving who makes a fortune, than he who squanders one—if this is true in money matters, it is much more so when applied to agriculture. A man who enriches sterile fields, and causes them to yield abundant crops, in doing so adds materially to the general stock of wealth, more, in my opinion, than one who hoards up money—but the one who ruins a piece of land, does a public injury, and is much more to be reprehended, than the spendthrift who spends his fortune—because in the latter case, the money only changes hands, whereas in the former, the soil passes away, and no one is benefited by the change.

Agriculture can be made to flourish either by directly aiding and patronizing it—(and as a consequence, manufactures, commerce, &c. would follow in its wake) or indirectly by making internal communications, building up cities and manufacturing establishments. But does it not appear most reasonable to have the materials in possession, or in other words to have produced the crops before we determine whether they shall be sent to market on such and such rail road or canal—or go to subsist this or that manufacturing community or commercial city? The other has the semblance at least of accomplishing the thing backwards, and this is plain, because agriculture is usually considered the great pivot upon which commerce and manufactures turn, and without it, they could not exist but to a very limited extent, inasmuch as their other resources are only secondary—therefore it being the most important, ought to be the first subject to call our attention. But circumstanced as we are, it may be best all things considered, to effect the object by combining the indirect with the direct means—in that event, we could certainly calculate on accomplishing our views, and that too, in the shortest period. It can be aided directly, by getting up societies for that purpose, and this I think would be a very efficient mode, and the more particularly as it is the order of the day to do most things either by societies or conventions. It could be aided most powerfully by our intelligent and wealthy men—let them study the subject, as it is practised to the north, and in Europe, and by skilful men of this state—let them make experiments, introduce the different improvements in utensils, cultivation, seed, stock, &c., and last, though not least, let them inform the public of the results of experiments—of the various articles introduced into the state—and of all of the new lights which time, practice, and information, under the guidance of strong heads and penetrating judgements may develope.

A plaster inspection has been essayed by our legislature, but unfortunately did not succeed. If the legislature could be convinced of the amount the farmers lose on that account, and of the great necessity of doing every thing in its power to foster a spirit of improvement, as well as of availing itself of every opportunity of strengthening public confidence both in the means used and the end thereby to be obtained—it could hardly be doubted but that inspections would be provided. Any of our practical and intelligent gentlemen would confer a favor on no inconsiderable portion of the farming community, by taking up the subject, stating its effect and importance, and urging the legislature to give it a more mature consideration.*

In concluding these reflections, allow me to say, that I have not the vanity to believe, that they will have much, if any effect, upon the minds of others. Great would be my gratification, if any thing I have said should induce older and abler men, to attempt the reformation of those abuses in our system of agriculture, which talent, energy, and perseverance combined, will infallibly accomplish. Let our intelligent and distinguished citizens light the torch and lead the way, and who will doubt the issue—who will doubt but that the substantial yeomanry of our state will follow? Let them by precept and example, give a tone to public opinion, awaken the attention and call into exercise the dormant powers of a people who possess the elements requisite to constitute a prosperous and powerful commonwealth. Let them endeavor to rescue an agricultural life from the odium which tavern politicians and "small-beer" lawyers have long been casting upon it, and convince young Virginians, that agricultural pursuits are conducive to health and virtue, and are not irreconcilable with expansion of mind, liberality of sentiment, or devoted patriotism.

E. W. H.

December 10th, 1834.

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*We differ with most persons as to the policy and effects of legal inspections in general—and have additional objections to the particular inspection recommended above. Unless the inspector possessed and exercised some chemical knowledge, (which could not be expected, from the usual manner of filling such appointments, and the rate of payment for the service,) his decisions as to the purity of gypsum, would be of very little worth.—*Ed. Farm. Reg.*

MONTHLY COMMERCIAL REPORT.

To the Editor of the Farmers' Register.

The month of July has been to the farmers a fortunate one—a favorable harvest was succeeded by peculiar circumstances, which enables those farmers who have facilities in getting their wheat to market early, to obtain higher prices than they anticipated. The first contracts made were at $1 15 per bushel, but a spirit of competition was excited among the millers, and particularly those whose new establishments are on an enormous scale, which without any circumstances to warrant it, caused the price to be run up to $1 25 and even $1 30. The farmers wisely availed themselves of this excitement which continued but for a few days, and during that short period most of the crops on or near James River and its tributary streams were sold, or rather contracted for, deliverable at early periods. It is estimated that the extent of these operations exceeded half a million of bushels. But so soon as the millers tired of playing this losing game on each other, the price declined to $1 10 for red, and $1 15 for white wheat, which rates are now current. It is to be desired that this enterprising spirit may not result in loss to the millers, so that it may be cherished hereafter. Some cargoes of new wheat which arrived at New York, were sold there at $1 16 while $1 25 was paid in Richmond.

The capacity of the mills in Richmond, and its immediate vicinity, is adequate to the manufacturing of about 500,000 barrels of flour per annum, if it were practicable to keep them supplied with grain. The best markets for their flour are in South America, but only a moderate portion of so large a quantity can be required in those markets. As the season advances the price of wheat will probably decline, unless some European demand shall arise.

With the progress of the inspections the impression that the tobacco crop will prove deficient, continues to gain ground, and the prices of such qualities as are suitable for shipment are well sustained. The lowest grade sells at $3 75 to $4 per 100 lbs. —good, fine and choice descriptions at $8 to 12, 13 and 14. Foreign capitalists are believed to be largely interested in purchases of this article, as well as of cotton during the present year. They may thus exercise a controlling influence on the prices abroad, so long as the supply does not greatly exceed the demand—but when the article has passed out of their hands, their efforts will be directed to reduce its value, that they may renew their speculations, which have thus far this year been successful.

The cotton manufacturers in England and France have done a larger and more profitable business this year than heretofore, and while supplies from this country have increased, those from other sources are smaller than usual—prices have therefore been well supported. The manufacturing establishments in Virginia have, on the contrary, been very unprofitable this year, and those in the northern states have suffered under the same influence. The business in cotton may be considered closed for the season. The last sales were at 12½ to 13¾ cents. The prospects for this and all other growing crops are reported to be favorable.

A change in the relative value of gold and silver to which the attention of congress had been repeatedly called for many years, has at length been enacted.

The pound sterling of Great Britain has been and is called par at $4 44. The gold sovereign of one pound sterling, was by our former standard worth $4 57; by the new regulation it is worth $4 84.6. This change will have the effect of increasing the value of bills on England, because if a bill for £1000 sterling could be purchased here for $4444, or even for $4500, an importation of 1000 sovereigns might be therewith made, which would be worth here $4846, and leave a good profit after paying interest, brokerage, and insurance. The importation of silver into this country will doubtless be diminished, and the exportation of gold will cease under existing circumstances.

It is presumable that the pressure for money which has prevailed for some months, will soon be partially, and perhaps extensively relieved, as it is announced that the United States Bank intends to increase its loans, and the State Banks will be enabled to follow the example. The duration of this relief must however, be very doubtful, and prudence will dictate that it be not relied upon to any great or durable extent.

The present current rate of exchange on England is 103½ to 104. Virginia Bank stock 102½ to 103. Farmers' Bank stock 100 to 100½. The late loan to the state of $100,000, was taken at 103½ for 5 per cent. stock, by a foreign house.

x.

July 25, 1834.

COMPARATIVE MORTALITY.

A curious official paper has been circulated, by order of the House of Commons, showing the comparative mortality in many large towns, &c., of the kingdom, from 1813 up to the present year. Among the towns included in this comparative calculation of mortality are, Leeds (town,) Bradford, Holbeck, Beeston, Wigan, Preston, Norwich, Bolton-le-Moors, London, Bury, (Lancashire,) Essex, &c. The result of the investigation of mortality may be concisely stated as follows:—Of children born there die, in Leeds, 53 per cent. under 5 years of age, and 62 per cent. under 20 years of age; in Bradford, 47 per cent. under 5, and 59 per cent. under 20 years of age; in Beeston, 39 per cent. under 5, and 52 per cent under 20 years of age; in Holbeck, 50 per cent. under 5, and 62 per cent. under 20 years of age; in Norwich, 42 per cent. under 5, and 50 per cent, under 20 years of age; in Bolton, 49 per cent. under 5, and 61 per cent. under 20 years of age; in Wigan, 48 per cent. under 5, and 59 per cent. under 20 years of age; in London, 38 per cent. under 5, and 46 per cent. under 20 years of age; in Rutland, 29 per cent. under 5, and 37½ per cent. under 20 years of age, &c. It further appears, that in Essex, Rutland, and the metropolis, persons live to an advanced age in a greater extent than others.—*Morn. Herald.*

PRESERVATION OF FRUIT TREES FROM HARES.

According to M. Bus, young fruit-trees may be preserved from the bites of hares, by rubbing them with fat, and especially hog's lard. Apple and pear trees thus protected, gave no signs of the attacks of these animals, though their footmarks were abundant on the snow around them..—*Bullet. Univers.*

ON THE PRAIRIES OF ALABAMA.

By W. W. M'Guire. (In a letter to the Editor.)

From Silliman's Journal of Sciences.

From the period of the first settlement of this state to the present time, the prairies have been objects of great curiosity and have attracted much attention; still, although the field for scientific investigation is so rich and interesting, no one has, to my knowledge, attempted a minute examination of it. The striking peculiarities of the soil, of geological configuration, and organic productions, especially in shells and other marine substance, which are found scattered indiscriminately over the prairies, are well adapted to attract attention, and to excite investigation respecting the period and causes of the formation of the prairies and their fossils. Many who have never conceived of the possibility of any great change of the surface of the earth, except that produced by the deluge recorded in the pentateuch, attribute to that event, the present position of these shells. Others, taking a still narrower view, believe them to have been removed by the agency of men from their native beds to the place where they are now found.

My own observations, although limited, have satisfied me that the prairies once consituted the boundary of the Atlantic Ocean. In support of this opinion there are still existing many satisfactory proofs, although ages must have elapsed since those changes took place; strong evidence also exists that this great change has been affected by the elevating power of earthquakes, volcanoes and subterranean heat. The face of the country, from the mountains to the prairies, is rough and uneven, presenting an outline differing from all other hilly or broken countries which I have ever seen. It abounds in iron pyrites and pebbles. Beds of good iron ore, of anthracite and bituminous coal, and of limestone and sandstone, are found in several places.

The country lying between the prairies and the sea coast is generally, if not altogether, of the same character as that on the coast from the Potomac to St. Mary's, viz: level sandy plains, some fertile, some sterile, either dry or swampy, and covered with pine, oak, cypress, cane, &c; but it generally, perhaps universally, shows the distinctive peculiarities of the above named coast. The changes in all places are sudden and abrupt, changing from the peculiar soil and character of the prairies, to that of the coast, which is sterile, in some places almost pure silica; or of alluvial formation along the rivers, swamps and marshes, differing in fertility, according to the portions in which silica and vegetable matter are mixed in their composition. This tract of country is from one hundred to one hundred and thirty miles wide, perhaps more.

In speaking of the prairies, the rock formation claims particular attention. It is uniformly found below the prairie soil, at various depths, ranging from ten to fifteen feet, and it sometimes projects above the ground. This rock is generally known by the name of rotten limestone; when removed for several feet on the top, and exposed to the action of the atmosphere for some time, it assumes a beautiful white color. In its soft state it is easily quarried, and blocks of almost any dimensions can be procured. It has been dressed by planes and other instruments, and used in building chimnies, some of which have stood twelve or fifteen years without injury or decay. A summer's seasoning is requisite to fit it for building. This rock has been penetrated by boring to depths varying from one hundred to five hundred and fifty feet; after the first six or seven feet, it is of a blueish or gray color, but still soft, except in a few instances, where flint strata of a foot thick or more have been met with. On perforating the rock, a full supply of good water is always obtained, which uniformly flows over the top. I have heard of no constant running stream of water over this rock, except one in Pickens county, near the lower line. The superincumbent earth is for a few feet composed principally of stiff clay, of whitish color; then comes the mould or soil, which is very black—in wet weather it is extremely miry and stiff, and in dry, very hard and compact.

Shells, such as the oyster, muscle, periwinkle, and some other kinds, are found in great quantities throughout almost all the prairies of Alabama and Mississippi; the first named being the most numerous, mixed in every proportion with the others. The oyster shells are perfectly similar to those now obtained from the oyster banks on the shores of the Atlantic. The largest beds of shells in the open prairies seem to occupy rather elevated but not the highest places. They have probably been removed from the more elevated situations by torrents of rain. It may be that the lowest places never contained any shells; or if they did, as vegetable matter accumulates in greater quantities in low situations, they may have been thus covered. In some instances I believe they have been found in such places, several feet below the surface. They are not found in very large quantities in the timbered prairies; and indeed, so far as I have observed, wherever the shells are numerous, vegetation is not so luxuriant as where there is a proper admixture of the decomposed or composing shells and vegetable matter.

These shells and other decomposing materials appear to have given a peculiar character to the prairie soil, which causes it to adhere so strongly to the legs of horses and to the wheels of carriages as to remain several days in travelling, unless washed or beaten off. Yet, when well broken up, at the proper season, and regularly ploughed, it remains quite mellow, producing corn and cotton equal to the best alluvial bottoms, with, so far as it has been tried, increased fertility; although from the compact nature of the rock beneath, and the tenacity with which it retains moisture, crops are injured sometimes by rains, but seldom by drought.

There being no opening or fissures, except above the rock, by which to convey the water directly to the channel of creeks and rivers, there are consequently no reservoirs to contain supplies for fountains and springs. In the winter and spring seasons the streams overflow and the land is literally submerged. In the summer and autumn neither springs or wells are to be found, except below the rock; yet notwithstanding this scarcity of water, there is seldom a lack of moisture for the purpose of vegetation. And at times when the drought is such as to produce fissures two or three inches wide and as many feet deep, the earth will be found quite moist at the depth of two or three inches.

As an evidence of the general moisture of the

prairie soil, below the surface, it may be remarked, that crawfishes are so very numerous in some situations as to prove very destructive to young corn, cotton, and other tender plants. After nightfall they issue from their holes or dens and commence their devastations. Their holes are of considerable depth, supposed to reach to the rock formation, a distance of from ten to fifteen feet; and on the surface of the ground regular and well built mud walls, five or six inches high are erected. The crawfish is of the crustaceous class, perhaps differing but slightly except in size, from the sea lobster. Their nocturnal perigrinations show that they differ at least in their habits, from the common crawfish found in our brooks.

Much of the soil is sterile, presenting low hills on which there is no timber; in other places, a small and stinted growth, such as black-jack and post oak. In some places there are considerable hills, having a thin stratum of excellent vegetable mould, covered with timber indicating a good soil; but from the close texture of the substratum, it is liable to be washed away, which has been the case in Washington and Clarke counties. In those counties, I am informed the rock projects more than in any other part of the prairies, and there are cliffs fifteen or twenty feet high.

There are open prairies of every size from one hundred to one thousand or twelve hundred acres mixed and interspersed in every form and mode with timbered land of all kinds; some producing only black-jack and post oak, not exceeding fifteen or twenty feet in height; others again covered with the most majestic oak, poplar, elm, hickory, walnut, pacaun, hackberry, grapevine and cane, equal in size and beauty, I understand to similar kinds in the Mississippi alluvions.

The extent of this country may not be unimportant. I am informed that traces of prairie soil may be seen in Georgia, perhaps as far east as Milledgeville. It is indeed said to exist in North Carolina; but of this I have not evidence such as to warrant the assertion. That it stretches nearly five hundred miles eastward from the vicinity of the Mississippi on the west almost to Milledgeville, there is no doubt; and if it extends, as is said to be the fact, to North Carolina, it reaches four hundred or five hundred miles farther, being perhaps nine hundred or one thousand miles long, and from forty to sixty in breadth.

That the prairies were once the boundary of the Atlantic is evident. 1. From the fact, that on both sides, they exhibit the indented and irregular appearance of a coast, uniformly stretching up the large water courses; and in general, the sandy low country stretches in a corresponding degree up the rivers into the prairies; but except it is more or less alluvial, is unlike the prairies. 2. They are nearly or quite parallel to the present shore. 3. The great quantity of sea shells, found scattered on so large a tract of country, very little of which is within one hundred miles of the sea coast, support the opinion now advanced. The idea of their having been carried thither by action of winds or tides, is precluded by the fact, that in that case, they must have been raised three or four hundred feet, and I presume in no place less than one hundred above the level of the Gulf of Mexico.

That the change was the effect of earthquakes, is evident from the appearance of the Mississippi. The "father of rivers" bears strong marks, that long before the earthquakes of 1811 '12, its course had been altered by some more powerful convulsion of nature; for its mighty current runs strongly against the seven bluffs below its junction with the Ohio, (except at St. Francisville,) seeming still to contend for its ancient channel. The prairies themselves afford strong proof of this position; for, in many places, they present the appearance of having been *lifted up*, and they are, in fact, considerably higher than the surrounding country. Much of the country of which I am speaking, besides the prairies, has that peculiar undulating appearance which corresponds with the expansive heavings of earthquakes.

To this theory an objection, at least, may be raised. Why is it that aquatic remains are not found between the prairies and the ocean? It may be replied that the marine exuviæ in the low country have long since been decomposed, while the shells in the prairies have remained in some instances, entire, for the want of suitable agents to act upon them; indeed, the prairies themselves illustrate this observation, for in all places where vegetable matter in considerable quantities has been brought to act, the shells are rapidly decomposing or have nearly passed through this process, and the vegetables have in consequence obtained a luxuriant growth. While on the other hand, in situations where shells are found in nearly their original state, it is readily perceived that the mass of actually decomposing materials, (except a partial influence of air and water,) is in small proportion to the whole accumulation.

The prairies present a more lovely and fascinating prospect in the spring and summer, than the liveliest imagination can picture. They are then clothed in the richest livery of those seasons—

"Plains immense, and interminable meads,
Lie stretch'd before—where the wandering eye,
Unfix'd is in verdant ocean lost,
Another flora there, of bolder hues,
And richer sweets, beyond our gardens pride,
Plays o'er the fields, and showers with sudden hand,
Exuberant spring."

Herds of cattle and flocks of sheep, are seen in the distance, cropping the fresh grass, or wandering at pleasure over the flowery region. Yet the absence of large trees, is amply repaid, by the rich garniture of grass, flowers and shrubbery. The odors of the wild rose, hawthorn, &c. load the summer's breeze with the most delicious perfumes. During the hottest and most sultry weather, when in other places, every thing is drooping and withering from excessive heat, a cool breeze is "ever on the wing." This is owing to the elevation of the prairies and the absence of timber.

During my last visit to the prairies, I found a substance existing in considerable quantities, resembling the coral, or some of the zoophytic families. It is nearly as hard as flint rock. I collected several specimens, but have lost them. Some months back, I saw in the possession of a gentleman, several very interesting prairie specimens. They were said to be *Shark's teeth*, from an inch to an inch and a half in length, slender and very sharp. Among them are also species of the vertebræ of fishes. They were procured in a section of the prairies which I have never visited; which abounding in specimens of the kind just mentioned, is the most interesting portion of this singular country.

It is a well established fact, that the earth and sea have undergone frequent and violent revolutions; and that the change that left the prairies dry is the most recent, is evident from the perfect state which shells, &c. are now found and from the fact that vegetation in many places, has made but slow progress. The nature of the soil indicates some ingredient adverse to many kinds of plants. But it is evidently fast changing, and it is not unlikely, that in the course of time, it will entirely lose its distinctive character and become perfectly amalgamated with vegetable matter. The process of decomposition and reproduction is rapidly going on in most places, and at every successive crop of plants, more matter is added, for the final accomplishment of the great change. It would be an interesting subject of inquiry whether the woodlands are not gradually encroaching upon naked places; and if so, it would show at once that the prairies are by natural operations, slowly losing their peculiarities.

Postscript.—A gentleman of Clarke County, Alabama, states, that on his plantation are parts of the back bone of some animal from eight to ten inches long, and proportionally large in circumference—some still held together by the cartilaginous ligatures. Many of the early settlers used them instead of *andirons*. There is no canal for the spinal marrow. An early settler informed him, that he had seen an entire skeleton, on the surface of the earth; it was of enormous dimensions, longer as is reported, than the largest whale.

SPECULATIONS ON RAIL ROADS.

From the American Rail Road Journal.

Has it never occurred to you that the capital vested in many rail roads and canals, is likely, if not exceedingly profitable at the commencement, to be eventually lost, from the roads and canals being superseded by others which may be made afterwards? The great and ultimate object of these improvements, is to facilitate exchanges—to cheapen and expedite transportation to and from market—as, between the great coal region, or between the great agricultural west and the best market, whether Philadelphia, New York, or Boston. Now, if it be assumed that transportation by rail roads, or by some better roads, steam being the impelling power, shall supersede, where practicable, *all other modes of locomotion*,—and I do not suspect myself of being alone in the opinion that there is no extravagance in such an assumption, particularly when we notice the progress of things in Europe—it is no more than reasonable to begin to contemplate, and try to forsee and act upon the natural and inevitable results which must follow, and to lay them before the public, that they may be fairly in view, and have proper consideration in the mind of every man, or company, when coming to a determination in regard to any proposed improvement, both as respects its location and the manner in which it shall be completed, or the amount of capital which may be safely invested in it.

The climate and productions of Europe and North America are so nearly alike, that as the state of science and the arts in these quarters of the world continues to come nearer to an equality, it is fair to conclude that the exchanges of merchandize will hardly keep pace with the increasing population of America. Still, as the condition of men is improving, and society and nations are becoming more intimate and friendly in their relations, and curious in their inquiries, we may suppose that travel for gratification will greatly increase between the two—this is proved by the number and constant increase of fine ships as packets; and it fairly indicates, in connection with the extent to which steamboats are coming into use, and the long voyages which they occasionally make, that the time is not distant when the packet ships will be propelled by steam. No rail road can be laid across the Atlantic. It will be an object to have each of the two ports in Europe and America, from whence most of these ships may be expected to depart for the other, situated conveniently as it respects the interior parts of the country, and as near together as may be. The wearisomeness of a long sea voyage will render these considerations indispensable, and may lead to some changes not now much thought of.

But to leave this part of the subject for a while, and dwell more particularly on our own United States.

To attain the greatest rapidity of motion will always be an object of controlling importance, and therefore level regions will be greatly desirable for the location of the principal thoroughfares. The intercourse and exchanges between the north and the south, must increase vastly beyond all precedent, and probably beyond all present anticipation of the most enthusiastic, for as speed of transportation increases, and the cost is reduced, the productions of each of the various climates will be vastly more consumed in the other climates; and the assumption is, that transportation by land will gradually take the place of water navigation, first, for persons travelling, and then for merchandize, and particularly on account of its expedition, safety, and regularity. This consideration is made stronger, from the fact that much of the interior, and the finest portion of North America, and that which will soon be the most productive and most densely settled, and of course require the greatest exchanges of this quarter, is already as near by land to the most important productions of southern climates, as it is to our eastern commercial ports. It is not too early, then, to begin the inquiry, where shall be our principal and leading roads? for it is plain that they are not yet located, and that they cannot be determined on judiciously without the most grand and enlarged views, and the most extensive and accurate surveys.

Without attempting to speak of details, which can of course be only determined by such surveys, it is pertinent, and may be profitable to notice, that the formation of the country, and the condition and wants of the citizens, present and future, clearly indicate that the road already commenced at Albany, must be continued without any regard to navigable waters, on the best and most level ground westward, indefinitely. That another road from Norfolk, or perhaps from Boston, must proceed southwardly over the level region, near the coast all the way, to some harbor where a town is yet to spring up near the south cape of East Florida, from whence there will be a busy steamboat intercourse with Havana; that a branch of this road will proceed, say from Savannah, to New Orleans, and thence into Texas, and onward,

onward. That another principal road will be from this new city on the Cape of Florida, into the great valley of the Mississippi. This brings me back to the thoughts which put me upon this essay, the errors likely to be made in the location of rail roads. I perceive some are designed to communicate only between one inland water navigation and another. These may prosper long enough to refund their cost; but the day is not distant when they will have comparatively little value.

Finally, as your journal is likely to be extensively preserved for future reading and reference, and as I am an old man, and shall hardly trouble you many times more, I ask of you the further favor to record a few prophecies.

First, fresh water navigation, including that of the Mississippi and all its tributaries, will be discontinued, probably within twenty years.

Secondly, New Orleans, and all cities in unhealthy situations, will greatly decline, and new cities and towns spring up in more healthful and advantageous situations, and that the queen of these will be somewhere at a point not yet thought of in the great valley.

And thirdly, that either Boston or Halifax is destined to take the sceptre from the highly favored city of the island.

And to conclude, again I would most respectfully hint to the men of Boston (and for this I hope they will remember my children) two things —first, to spare no pains, nor grudge any capital either in the location or construction of their westward and southward rail roads; and secondly, to turn their attention to European steam packets on a large scale. I beg pardon: Boston folks need no hint from me on their own affairs.

C. O.

Deep Creek, Sept. 5, 1833.

BOAT BRIDGES FOR RAIL ROADS.

From a Camden (S. C.) paper.

Much apprehension is entertained, as to the difficulty of passing the Santee or Wateree, for the want of a bridge. If the reader will refer to the Journal of the Franklin Institute for June, 1832, he will see the matter scientifically discussed and illustrated. We add a letter from a traveller who speaks of it in a familiar manner.

Boat Bridges.

Extract of a letter from a gentleman who has recently travelled in Germany.

"The boat bridges on the Rhine appeared to me, to be as capable of taking as great a load as the Columbia bridge.* The Diligences in that country, weigh about 3000 lbs. without a load, and carry from twenty to thirty passengers; and, on the top much merchandize, &c. They could easily take all the cars I have ever seen on the Charleston Rail Road, with all their load.

"The Rhine at Cologne is very much such a river as the Santee. It overflows in the same way. At Cologne, high walls confine it. Just above Cologne, the mountains begin. At Mentz, the low grounds between the mountains on each side of the river commence—and so it continues till you get to Basle in Switzerland.

"These boat bridges are in various places, viz: Cologne, Bonne, Coblentz, Mentz, Worms, Spires, Manheim, Strasburg, &c. I have often thought such bridges would admirably suit our state.

"Seven, eight or twelve boats are anchored in the stream, and the anchors are secured with piles of stone. The boat has a considerable (query chain) cable attached to the anchor, so as to rise and fall with the freshet. Uprights are framed upon these boats, and bridges thrown across them —each boat answering for a pier. A swinging platform is fixed on the shore—this is connected with the main bridge, by a falling bridge, (a draw bridge,) lifted up by ropes fixed on the principle of the crane. In this way the crossing is made to accommodate the rises and falls of the river. Places are also made to lift up the draws or bridge, to let the vessels pass up and down the river."

C.

* For the information of strangers, it is well to observe that this bridge is built on the shoals, and that it has a foundation of the very best kind.

ROAD MAKING.

From the National Intelligencer.

Replies to questions by Mr. John Davis, dated 27th Nov. 1822, *from Hagerstown.*

Line of the road.—This branch belongs to the engineer, and no general directions can be given respecting it.

Surface or bed of the road.—The bed of a road is the soil of the country, after being made smooth, and as level as circumstances will admit.

The great object of road making, is to preserve this *bed* from wet, which assails it both from below, and from above; the under water is to be kept off by side drains, that shall always keep the water of the soil some inches below the level of the *bed*, at every season of the year, and should the line be so level and low as that no sufficient fall can be got to bring the water of the soil below the *bed* of the road, in such case, the *bed* must be raised above the level of the water.

This principle of preserving the *bed* of a road from lying in water, is founded on the reason that if a road be laid in water, the sub-soil is kept soft, and the road will surely be pressed into it by heavy carriages—and in winter the frost affects that wet soil so as to lift up the whole mass—by which it is loosened, and on a thaw is broken to pieces. These reasons have been found sufficient to induce the abandonment of the former practice of digging a trench, into which the road was placed, and which ensured the *bed* of the road being wet at almost all seasons of the year.

The wet from above is to be kept from the *bed* by the materials (or as we term it the metal) of the road, broken of stone, of angular form, skilfully and carefully laid on, forming a body so compact as to be an effectual cover or roof to prevent water from penetrating from above.

Having secured the *bed* or natural soil of the country from wet, it is of itself sufficiently strong to carry *any* weight; there is, therefore, no necessity for the bottom or foundation, as it is called, of large stones, which, if they were not injurious, are objectionable, on account of the useless expense; but this bottom is positively injurious, inasmuch as it is constantly shaken by heavy carriages, which keeps the upper stratum always loose and open to receive rain water.

When the *bed* is duly prepared and dry, the stone (or as we call it the metal) is to be laid on, not all at once, but in layers of three inches thick, after the first three inches are laid on, it is to be subjected to the traffic, or if the road is not open to traffic, then to be rolled with the iron roller; when there is showery weather: or it must be wetted by water thrown upon it—for you will find that no stone will consolidate when perfectly dry.

When the first coat of metal has in some degree settled and become consolidated, a second coat of three inches thick, is to be laid on and rolled as before, unless you have traffic—in which case great care must be taken to rake the road constantly with the iron rakes, filling the tracks made by every carriage so as not to be seen by that succeeding, until the road is quite consolidated, after which it will take no damage, nor fall into ruts from any shape or size of wheel, or weight of carriage.

Much has been said and written upon the *strength* of roads—my experience leads me to the conclusion, that six inches thickness of well broken, well laid stone, is quite sufficient, provided the *bed* be *made* and kept dry. I have of late years made no new road thicker; but have, on the second year, given it an addition of three inches, loosing a little the hard surface of the road, about an inch deep, to allow the new and old metals to join and unite in a compact body—going upon the principle that the natural soil is the real carrier, both of the road and the carriages, and that if it could be kept dry by any other means, the artificial road would be altogether unnecessary, and as six inches of metal is as effectual a proof, or covering, as a larger quantity, there is no use in being at the expense of more.

Materials for metal.—The gradations of quality in this country, of stone for roads, are considered to be—*first*, granite,—*second*, good flint,—*third*, hard lime stone.

In America, where the summers are dry, and hot, I should prefer hard lime stone to flint—because the latter is very apt to become loose in very dry weather; but whatever materials be used, it should be broken very small; in recommending six ounces as the proper size, I went as far as the *then* old prejudices would admit; but experience has convinced me, that half the size is more useful and more profitable to the country. When the stone is well broken and properly applied, there is no occasion for the covering of gravel or slate—and I object to it as preventing the consolidation of the stone by keeping the pieces apart, whereas they should unite by their own angles. The slope of a road should be as little as possible, to throw off the surface water; and I have found an inch in a yard, from the centre to the side, to be sufficient; if the surface be smooth and solid, no water can stand on such a slope—and the more you can allow carriages to stand upright, the easier they will run.

The reason of recommending the laying on of the stone at different times, and in layers, is, that if the whole quantity be laid on at once, the underpart never consolidates properly, but continues loose, and is apt to be shaken by heavy carriages, and thereby to loosen the upper part, so as to make the road receive rain water.

Having resided fourteen years in America, I am aware of the severity of the frost, and of the heavy and sudden summer showers. These circumstances make it more necessary to be very attentive to keeping dry the *bed* of your roads, as frost will assuredly reach them every winter; whereas, the frosts of this climate are not so violent, and do not reach the bottom of our roads, perhaps on an average of seven years.

On hilly ground, great care should be taken to keep the side water ways clear and open, otherwise rain water will get in under the road, and seek its way between the metal and the bed down the slope, for a great distance.

In a country like America, where many new roads must necessarily be made, it is of the greatest consequence to follow the most economical course, in order to make the funds appropriated to roads, produce the greatest sum of good to the public.

The old system of digging trenches, and filling them again with stone, is to be avoided as a very useless waste of the funds, it being evident that the expense of this mischievous process is greater than making the same length of road on good principles.

JOHN LOUDON MACADAM.

BONE-DUST FOR CULTIVATION OF GRAIN.

The exportation of bones from Germany to England constitutes a singular epoch in the annals of commerce. Myriads of tons have been already exported without glutting the market, or causing a cessation of the demand. In the vicinity of the North Sea, mills have been erected to pulverize them. This bone-powder, or bone-dust, was long ago exclusively applied to the purposes of hothouses by German horticulturists; but the English, emboldened by their riches, have extended its use to general objects of agriculture, and fertilize, by these expensive means, their cold, humid, and poorest land; and have thus brought the uplands of Nottinghamshire, the western parts of Holderness, &c., into the highest state of cultivation, both in point of extent and intenseness of fertility. There is, consequently, a proverb, "that one ton of German bone-dust saves the importation of ten tons of German corn." As Malta formerly covered her naked rocks with foreign soil, so does England now fertilize her clay and sandy heaths with German bones. Near the sea-coast even the churchyards are robbed of their venerable relics, which is only ironically excused by rendering the German bone trade popular. An agriculturist, being rendered attentive by this vast exportation, instituted privately some comparative experiments, the results of which prove that bone-dust acts in the cultivation of grain, as compared to the best stable manure, —1. In respect to the quality of corn as 7 to 5;—2. In respect to quantity as 5 to 4;—3. In respect to durability of the energy of soils as 3 to 2. It produces several collateral advantages;—1. It destroys weeds;—2. It diminishes the necessity of suffering the land to lie fallow;—3. This concentrated manure, or substitute for manure, is more easy of conveyance, less laborious to spread, and can with facility be applied to the steepest vineyards or other inaccessible lands, either in mountainous countries or in wet meadow land;—4. It renders agriculture practicable without cattle-breeding, grazing, &c.—*Repertory of Inventions.*

EELS.

From Mr. Jesse's Gleanings.

Several pages are devoted to the economy of these curious creatures, and as many points of their history are warmly contested, Mr. Jesse's experience is valuable.

That they do wander from one place to another is evident, as I am assured that they have been found in ponds in Richmond Park, which had been previously cleaned out and mudded, and into which no water could run except from the springs which supplied it.* An annual migration of young eels takes place in the River Thames in the month of May, and they have generally made their appearance at Kingston, in their way upwards, about the second week in that month, and accident has so determined it, that, for several years together it was remarked that the 10th of May was the day of what the fishermen call eel-fair; but they have been more irregular in their proceedings since the interruption of the lock at Teddington. These young eels are about two inches in length, and they make their approach in one regular and undeviating column of about five inches in breadth, and as thick together as it is possible for them to be. As the procession generally lasts two or three days, and as they appear to move at the rate of nearly two miles and a half an hour, some idea may be formed of their enormous number.

Eels feed on almost all animal substances, whether dead or living. It is well known that they devour the young of all water-fowl that are not too large for them. Mr. Bingley states, that he saw exposed for sale at Retford, in Nottinghamshire, a quantity of eels that would have filled a couple of wheel-barrows, the whole of which had been taken out of the body of a dead horse, thrown into a ditch near one of the adjacent villages; and a friend of mine saw the body of a man taken out of the Serpentine River, in Hyde Park, where it had been some time, and from which a large eel crawled out. The winter retreat of eels is very curious. They not only get deep into the mud, but in Bushy Park, where the mud in the ponds is not very deep, and what there is, is of a sandy nature, the eels make their way under the banks of the ponds, and have been found knotted together in a large mass. Eels vary much in size in different waters. The largest I ever caught was in Richmond Park, and it weighed five pounds, but some are stated to have been caught in Ireland which weighed from fifteen to twenty pounds. Seven pounds is, I believe, no unusual size. The large ones are extremely strong and muscular.

TO FREE FRUIT-TREES FROM MOSS AND INSECTS.

Mr. James Thomas, of Derveruden Green, near Chepstow, has found the following mixture an excellent application for the purpose. The mixture is made by taking five bushels of well-burnt lime fresh from the kiln, and slacking it with hot water, in which salt has been dissolved. When the lime has fallen to a fine dry powder, add, by small quantities at a time, a bushel of soot, stirring it in till the two ingredients are completely incorporated. Advantage is to be taken of the first foggy day, when the trees are damp, but not dripping, to dust them over with this powder. One man may treat fifty trees in a day, and the operation in Mr. Thomas's opinion, should be repeated twice a year; the first time in March, and the second time in October or November. Mr. Thomas has likewise found, that the grass beneath his trees, which used to be full of moss, has now become a fine sward, quite free from moss, no doubt in consequence of those particles of the composition which fell to the ground during the dusting of the trees.—*Transactions of the Society of Arts.*

THE MOLE.

It is remarkable that this animal sometimes gives notice of a change of weather. The temperature or dryness of the air governs its motions as to the depth at which it lives or works. This is partly from its inability to bear cold or thirst, but chiefly from the necessity it is under of following its natural food, the earth worm, (Lumbricus terrestris.) which always decends as the cold or drought increases. In frosty weather, both worms and moles are deeper in the ground than at other times, and both seem to be sensible of an approaching change to warmer weather before there are any perceptible signs of it in the atmosphere. When it is observed, therefore, that moles are casting hills through openings in the frozen turf, or through a thin covering of snow, a change to open weather may be shortly expected.

The cause of this appears to be as follows:—The natural heat of the earth being for a time pent in by the frozen surface, accumulates below it; first incites to action the animals, thaws the frozen surface, and at length escapes into the air, which it warms and softens; and if not counter-balanced by a greater degree of cold in the atmosphere, brings about a change. Changes from frosty to mild weather, caused by the ascent of heat from the earth, are often so evident, that the circumstance needs no confirmation. Stronger proof, if proof were necessary, cannot be given than the common appearance of frost or snow remaining longer upon ground having a stratum of rock beneath, than upon that where there is none. Old foundations of buildings, which have not been dug out, are easily traced by the same appearance; and any subterraneous solid body, as large stones, drains, planks, or pieces of timber, may be discovered in the same way; and even a plank laid across a ditch at such times will remain covered with snow for many hours after the snow on the ground is all melted and gone. This sufficiently accounts for the activity of the mole before a change of weather, and deserves to be noted by the meteorologist among his other prognostics of the weather.

The mole, though generally a despised and persecuted animal, is nevertheless useful in some degree to the husbandman, in being the natural drainer of his land, and destroyer of worms. To other inferior animals he is a sapper and miner, forming for them their safe retreats and well secured dormitories.—*Magazine of Natural History.*

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* I have been informed, upon the authority of a nobleman well known for his attachment to field sports, that, if an eel is found on land, its head is invariably turned towards the sea, for which it is always observed to make in the most direct line possible. If this information is correct (and there seems to be no reason to doubt it,) it shows that the eel, like the swallow, is possessed of a strong migratory instinct. May we not suppose that the swallow, like the eel, performs its migrations in the same undeviating course?

DIARY OF THE TEMPERATURE AND STATE OF THE WEATHER, FROM APRIL 1, TO JUNE 30, 1834,—OBSERVED AT FORT MONROE.

APRIL.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	55	63	62	E.	cloudy.
2	63	62	56	N. E.	"
3	50	50	48	"	"
4	44	48	43	"	rain.
5	41	44	41	"	"
6	44	48	47	"	"
7	52	56	52	"	cloudy.
8	51	60	57	S.	fair.
9	53	61	56	N.	rain.
10	51	56	51	N. E.	cloudy.
11	49	54	53	"	"
12	51	56	54	"	"
13	54	58	55	"	"
14	53	58	56	"	fair.
15	55	64	58	"	cloudy.
16	56	66	60	E.	"
17	57	74	69	"	fair.
18	57	66	52	N. E.	cloudy.
19	57	64	62	E.	"
20	56	65	61	S. W.	fair.
21	58	72	70	S. E.	"
22	64	80	73	S. W.	"
23	66	78	72	"	"
24	58	72	60	S. E.	"
25	58	64	52	N. E.	rain.
26	46	56	55	N. W.	cloudy.
27	40	62	53	N.	"
28	48	68	60	W.	fair.
29	55	61	54	S. W.	cloudy.
30	54	60	58	"	fair.
31					
	1596	1846	1700	Total No. of degrees.	

MAY.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	54	62	61	N. E.	fair.
2	55	63	60	N.	cloudy.
3	54	52	52	"	fair.
4	56	63	60	S. E.	"
5	61	67	69	"	rain.
6	58	73	65	W.	fair.
7	65	76	64	S. W.	"
8	62	64	59	E.	rain.
9	56	68	63	S. E.	fair.
10	56	74	60	S.	"
11	57	75	70	S. W.	"
12	66	67	64	"	"
13	54	63	57	N.	"
14	48	68	66	S. W.	"
15	49	54	50	N. E.	"
16	44	56	53	N.	"
17	49	64	58	S. W.	"
18	57	65	63	"	"
19	61	75	71	"	"
20	70	76	71	S.	"
21	71	78	69	S. W.	"
22	70	82	72	S.	"
23	66	80	72	E.	cloudy.
24	70	76	70	S. W.	"
25	69	74	72	W.	rain.
26	69	74	70	S. W.	fair.
27	68	70	68	E.	cloudy.
28	67	71	68	S. E.	"
29	68	70	69	"	"
30	67	72	68	E.	"
31	67	72	70	S.	"
	18184	2144	2004	Total No. of degrees.	

JUNE.	THERMOMETER. VII. A. M.	II. P. M.	IX. P. M.	WINDS.	WEATHER
1	69	76	71	S.	rain.
2	69	81	72	S. W.	fair.
3	67	76	73	"	"
4	69	77	67	N. E.	cloudy.
5	63	71	67	S. W.	fair.
6	65	71	69	W.	"
7	68	76	74	S. W.	"
8	71	80	78	S.	"
9	73	84	82	"	"
10	75	89	83	"	"
11	78	83	79	W.	"
12	66	72	68	S.	"
13	68	82	76	"	"
14	69	74	70	"	"
15	68	73	68	S. E.	cloudy.
16	70	74	70	E.	"
17	68	76	76	N. E.	fair.
18	72	82	76	S.	"
19	69	81	76	"	"
20	72	79	75	S. W.	"
21	69	81	74	N. W.	cloudy.
22	73	86	82	N. E.	"
23	74	84	78	S. E.	"
24	76	82	75	N. W.	"
25	72	84	78	S. E.	"
26	74	91	83	S.	"
27	75	79	75	N.	"
28	79	85	79	N. E.	"
29	74	87	78	N. W.	"
30	75	80	77	W.	"
31					
	2130	2396	2249	Total No. of degrees.	

ABSTRACT FOR THE QUARTER.

MONTHS.	THERMOMETER. Highest degree. VII.	II.	IX.	Lowest degree. VII.	II.	IX.	Mean temperature VII.	II.	IX.	Hottest Day.	Coldest Day.	WINDS. N. Days.	N. W. Days.	N. E. Days.	E. Days.	S. E. Days.	S. Days.	S. W. Days.	W. Days.	Prevailing.	WEATHER. Fair. Days.	Cloudy. Days.	Rain. Days.	Snow. Days.	Prevailing.
APRIL.	66	80	73	40	44	41	53	61	56	22	5	2	1	14	4	2	1	5	1	N. E. S. W. S.	10	15	5		cloudy.
MAY.	71	82	72	44	52	50	60	69	64	22	16	4	3	2	4	5	4	10	2		20	8	3		fair.
JUNE.	79	91	83	63	71	67	71	79	74	28	6	1		4	2	3	9	5	3		16	13	1		fair.

SEASON AND CROPS.

Essex county, July 5th, 1834.

To the Editor of the Farmers' Register.

The crop of wheat was very unpromising in the spring; we had about three weeks of dry weather in May, which is generally as destructive to the wheat crop, as three weeks of dry weather is to the corn crop in August; it enables the fly to destroy the growing branches, while the growth remains almost stationary, after which the crop is mostly dependent upon the latter branches, which never produce an abundant one, and but seldom an average one, unless the weather is peculiarly favorable, which was the case this year: for the dry weather was succeeded by frequent rains, which gave the wheat a rapid growth, and though the rains partially washed the bloom off and made the head in some degree defective, this was more than counterbalanced by an additional increase of product. The weather also became dry and fine a few days before it ripened, which saved it from the rust, which otherwise it would probably have had, as it was filled with sap—in consequence of which, it is probable the crop will be an average one, both in quantity and quality. After a warm dry spring we may anticipate a small harvest; after a cold and wet one an abundant harvest; the cold and wet keep the fly in check, and the wet causes the wheat to branch freely.

The corn crop at this time exhibits the most luxuriant growth, but this is by no means a proof that we shall realise an abundant crop, but rather to the contrary. A growth of corn uncommonly large for the quality of the land, requires a continuation of moisture to bring it to perfection, which is seldom the case in our climate, or else the moisture goes to support the life of the stalk, not to form the ear. Big stalks and little ears are not uncommon. A stalk of ordinary size for the quality of the land, early in the summer, is greatly to be preferred; though I have seen very small stalks produce abundant crops. One of the best crops of corn I have ever made, was remarkably unpromising in the spring and the early part of the summer, owing to the extreme dryness of the weather. An acquaintance who saw my crop, said he did not think I would make enough for seed, and said that he would furnish me; but about the right time the weather became very seasonable, and the little stalks began to tassel and silk, and by the time the ears had completed their growth, their ends hung down nearly to the ground, and proved a most abundant crop. * * * * * *

FEEDING STOCK.

Mr. Howden, in the *Transactions of the Highland Society*, says, "as a summary of lengthened detail, it seems to me that the food for cattle, whether raised from the land in the shape of Swedish turnips, potatoes, or mangel wurzel, is not materially different, provided the crops are alike good of their kind. A less quantity, and inferior quality, of manure, will produce the potatoes even on land where the soil and climate are not so favorable; but I have ever seen, at the end of a rotation, the land upon which potatoes had been grown in the worst condition; and to obviate this, it is of use, I think, to cultivate a variety which covers well in the drill.

IMPROVEMENT OF WORN LANDS.

Brookfield, 12th July, 1834.

To the Editor of the Farmers' Register.

I observe in your Register for June, some remarks by S. B. from Powhatan, on "Exhausting and improving cultivation." In addition to his modes of improving exhausted or naturally poor land, I would beg to lay before your readers, a mode of improvement adopted in many parts of Europe, and particularly in England and Scotland. Many of your readers must be acquainted with it from theory, but I am not aware of its ever having been put properly into practice in this country. The mode to which I allude is, the fallowing of land with a crop of turnips and eating them off the ground with sheep, either the whole of the crop, or two-thirds of it, as it may be abundant or deficient. The mode as adopted in Scotland, where I have had it in extensive practice, is, land which is wished to be laid down in grass and in good condition, is well prepared in the early part of the season by repeated ploughing, as the nature or condition of the soil may require, until properly pulverized: the ground generally receives a partial manuring. Bone manure is generally used for that crop, and is sown in the drills with the machine at the same time the turnips are. In the absence of a supply of bone manure, stable-yard manure is used. The turnips are regularly ploughed, hoed, and thinned out to a given space, plant from plant, as the kind of root may require. Early in winter a moveable fence is used to inclose a space of the field proportioned to the number of sheep. In addition to the turnips, the sheep have oat straw or hay given to them in severe weather, which is placed for them in a moveable and covered rack, and this moveable fence is extended or removed from time to time as the whole are eaten off. The ground is then ploughed up for the reception of the grain meant to be sown in it. This mode of improving worn out or poor soils in Scotland, has been attended with the most beneficial results. Land which to my own knowledge a few years ago was scarce worth the fencing in, is now, from this mode of manuring, producing from thirty to forty bushels of wheat an acre. It is to be observed, that it does not generally succeed well in wet or low lands. From the difference of climate I am not from experience prepared to say that the same mode would be attended in this country with the same amount of beneficial result; but as so much is wanted here to improve worn out land, I should think the matter worthy a patient trial; if it failed, it could be no great loss—and if it succeeded it would be of incalculable benefit. The spirit of agricultural improvement in this country is now evidently beginning to expand itself. It is doubtless the duty and interest of every one to aid the good work so far as in their power. The number of emigrations from this part of the county is a source of general remark and regret; and it is doubtless a matter of deep regret, that so many of the industrious citizens of the Atlantic States should be compelled to remove to the far-off western country. And the general reason assigned for such emigration is, that the land here will not now, as formerly, repay the labors bestowed on it, or, in many instances, afford even a scanty subsistence to its owners. This failure, which is unjustly attributed to the ungrateful nature of the soil, is the unavoidable result of an injudicious, improvident, and ruinous system (if it can be so called) of agriculture; but the fact that they carry with them the same injudicious system, is a matter of deeper and more serious regret, than the bare fact of their emigration. For, after they have labored hard for a few years to clear a few acres of land of its timber, they, by following their old system, must unavoidably after a few years have the same difficulties to encounter, and another removal farther into the interior be the result, until the whole face of the country, naturally rich and productive, become a comparative barren waste These emigrants are termed the pioneers of the forests, and have to encounter many a hardship, and sacrifice many an endearing tie. But those men who become the owners of the lands which they have left, have a task no less difficult and arduous, and certainly much more delicate to perform than clearing land from wood. They, in order to obtain a subsistence, must reclaim land which has been exhausted by an impoverishing mode of farming, an object which can only be obtained after a lapse of time and much perseverance. Let the citizens of this commonwealth think on the numbers of their forefathers who died under the tomahawk and scalping-knife of the savage and unreclaimed Indian, in obtaining for them their *now* peaceful possessions, and on the thousands of patriots who died in the defence of their dearest rights, and in securing for their descendants a glorious liberty and independence. And was all this blood spilt to obtain a country so unproductive as not to supply her children with bread? Certainly not. Citizens of this happy and free country, providence has cast your lot in a land capable, under judicious management, producing every comfort, necessary, and luxury of life even to overflowing, and will you not avail yourselves of these important blessings? If means are amply in your own hands, it only wants example, energy and enterprise to secure to you and your children their full enjoyment. Your patriotic forefathers nobly withstood the efforts of a proud ambitious and invading foe, and victory and independence was their rich reward.

You have now a foe within yourselves in the internal management of your dearly purchased possessions, which strikes as deeply (and much more insiduously) at the root of your dearest interests, and which, if not speedily met and combatted with, must ere long present you with the appalling spectacle of your lands reduced to barrenness, and your children without bread. Come forward then, and let every energy be aroused, and every prejudice manfully combatted with, and you will have the pleasing reward of seeing yourselves and your children enjoying those blessings so hardly purchased, not only in peace, but in comfort, plenty, and happiness. This great, and rapidly increasing republic, already stands second to none in commercial importance and in the trading enterprise of her citizens. Why should she not also rank high amongst the first of nations for her agricultural enterprise and prosperity? Her ships, or rather her floating palaces are held up as models of naval architecture to the world: why should not her agricultural implements rank on the same scale? Surely they are of as much importance. Her mariners and machinists are considered equal if not superior to any in the civilized world: why

should not her agriculturists rank equally high? These defects in the general agricultural management of this country can only be ascribed to the not duly considering the paramount importance of a good system of agriculture to any country; and to this country in particular, with its rapidly increasing population, it is of vital importance. The good work requires only to be begun: Let but a few of its wealthy, enterprizing, and influential farmers, adopt the proper measures for renovating their wasted lands, and the proofs of their unavoidable success will soon induce one and all of the cultivators of the soil to adopt similar measures. Then will there be fewer painful emigrations, greater comfort, and more contentment amongst the citizens of this highly favored land.

A. N.

P. S. The hint given by your correspondent S. B. as to the propriety and necessity "of your agricultural friends in different parts of the country, to give you a monthly report of the growing crops" is, I think, of essential importance to every farmer. My own observations are extremely limited, scarcely extending beyond the bounds of the farm I immediately superintend, and on which, I have only resided for a short time back. I will however, give you them as they occcurred to me.

The wheat on this farm (Brookfield Henrico,) may be considered a deficient crop. It appears in the low lands to have suffered much during the winter, and it has also suffered much from a disease called in this neighborhood *stunt;* the term is new to me, as are also the general features of the disease, the most prominent of which, are, that from one-fourth to one-half of a great part of the ears from the top of the ears downwards are destitute of grain. From the partial examination which I was enabled to give to the matter, I found generally the tap-root of each diseased head to be in a decayed state, and embedded in the chaff; when the grain was wanting, I could easily detect the presence of a very minute worm, or fly in that stage of existence—I think, deposited there before the flowering of the wheat. On this farm I think the high lands have suffered more from this disease than the low. The generality of farmers in this neighborhood complain much of the ravages of this disease; some of them calculating that their crops are deficient by one-third.

Our corn on this farm suffered much from the frosts of the 15th 16th and 17th of May—having almost the appearance of being entirely cut down. It however, on the return of mild weather, speedily recovered; and those parts of our crops which appeared to suffer most at that time, are now the most vigorous, and from eight to ten days in advance of those parts which suffered to appearance comparatively little injury.

A. N.

TO RESTORE FROSTED POTATOES.

A most effectual method has been discovered by a Cumberland gentleman. It is simply to allow the potatoes to remain in the pits, after a severe frost, till the mild weather is set in for some weeks, and allowing them to recover gradually. If once exposed to the atmospheric air, no art will recover frosted potatoes.—*Repertory of Inventions.*

PLANARIÆ.

On January the 27th, at the Royal Institution, Mr. Faraday proceeded to lay before the literati assembled, an account of Dr. R. Johnson's investigations into the *restorative*, *productive*, and *reproductive* powers of the Planariæ, a genus of small animals allied to the leech, and of which there are several known species, viz. P. torva, lactea, hastata, arethusa, felina, &c., the three first of which are to be found abundantly in a pond near the Red-House, Battersea-fields.

From Dr. Johnson's experiments it appears, that if an incision be made longitudinally into the head of the animal, so as to separate its eyes from each other, if the cut has not been carried very far down, it will heal in the ordinary manner; but if the head be absolutely cleft in twain, then according to the extent of the fissure, there will be a mass of new matter formed by each half of the head, which will either join the two halves together, forming a head of extraordinary size, and bearing in it one or two additional eyes; or each old half, thus cleft, will form the new matter into another half, with an eye, and so the animal have two complete and entire heads. If the fissure be carried farther down through the body of the animal, then not only will there be two heads, but two bodies also formed, joined together only by the tail; and when this is the case, so little unanimity does there exist between these *siamoid* twin-planariæ, that they never pull or swim the same way; and so violent are their efforts, that they frequently, in the course of two or three days, tear the only remaining bond of union, their tail, in sunder, and then two distinct and perfect animals result.

If in a common planariæ the head be cut entirely off, a new head will be formed; and if its lower extremity be removed, it will produce a new tail. In a planariæ, which, by the operation above described, had been invested with two heads, these "nova capita" were successively severed for three several generations, and were immediately and perfectly renewed, and subsequently the animal was cut through just below the artificial bifurcation, and then only a single head was produced, so that in this more simple "capital" operation, a single headed animal became a biceps, and, after having had the use of six heads in succession, was subsequently reduced to the possession of a single one.

When one of these animals is cut in half, the head, or anterior extremity, swims away as if nothing had happened, and speedily re-tails itself; but the tail swims to the bottom, and remains torpid for two or three days, by which time it has formed for itself a head. If a planariæ be cut into three pieces, the head will form a new body and tail, the tail a new body and head, and the middle section, or body, will produce both head and tail. If a quarter be removed by making a longitudinal incision through the head, and half down the body, and then a semi-transverse cut to remove the upper quarter, not only will the three remaining quarters speedily reproduce a new fourth, but also the separated fourth will form to itself three new quarters. Indeed, a planariæ has been cut into as many as ten pieces, and each piece has become an entire and perfect animal. In fact, this mode of propagation, which physiologists artificially institute, seems to be frequently resorted to by the animal

itself. The planaria felina has been seen to throw off pieces of its body, to form new animals, and these are not diseased but healthy parts, and not only parts of its tail, but often offsets from its sides, &c. Indeed, the planaria felina, and P. arethusa, have been never known to lay eggs, whilst the torva, lactea, &c. lay them in abundance, both the original animals, and those artificially produced. It would seem that those species which inhabit springs and running waters, propagate only by division; but those which dwell in ponds and ditches, where the water is occasionally exhausted, are oviparous, as well as viviparous.

The above facts are physiologically curious, as they show a still closer affinity than had been previously supposed to exist between the propagation of plants and animals by cuttings, as well as seeds; for they have shown that this mode of propagation can be carried to an almost equal extent in the one as in the other—an extent to which the experiments of Trembley, and others, on polypi, star fish, &c. did not reach.—*Medical and Surgical Journal.*

DISCONTINUANCES OF SUBSCRIPTIONS.

The close of the volume of a periodical published like this, is the time when all the discontinuances of subscribers are (or ought to be) sent in. The notices of this kind which we have received are fewer than were expected, and have been more than equalled by new subscriptions sent in during the same time. But though we have no reason to complain of the number of discontinuances, there is much ground for objection to the time and manner of a large portion of them. It is not probable that any *reader* of the Register could fail to know when the first volume closed—and *then* (according to usage and equity, and also according to our terms particularly stated in the May No.) was the time for all to discontinue who wished it, and who had not given earlier notice to that end. Instead of this, more than half the orders for discontinuances were sent in after the 1st No. of Vol. II, was mailed—some after the 2nd No.—and some from persons who had not, and have not yet, paid any thing, and therefore had no *right* to discontinue, even at a proper time. Still however, nearly all these requests have been promptly complied with, as we do not wish to retain any subscriber against his will. But, in our own defence, there must be some limit to such exactions, and a few of the latest and most inexcusable of these requests have been refused. The following letter relates to one of them, and may serve as an example of the hardship to which we are subjected in this respect.

——— *Post Office, July* 17*th*, 1834.

Sir—Enclosed is $5, which ——— ———, a subscriber to the Farmers' Register at this office requests you to place to his credit, and discontinue his subscription. He has received two numbers of the Register for the present year, which he says, he will return if you wish it.

Yours, very respectfully,

——— ——— P. M.

All scruples as to a failure in good faith, we suppose, are quieted by sending back the copies of Vol. II. and when this has been done, they generally are nearly ruined for want of careful wrapping, and always burdened with postage for the editor to pay.

The receiving and paying for our publication is a mere business transaction between the subscriber and editor—and no one should hesitate to stop his subscription, who does not receive for it compensation in the value of the work. We consider that no apology is required for any discontinuance, and certainly shall never complain of them. But on the other hand, it is due to our interest and our just rights, and indeed to the very existence of our publication, that our terms, and the demands of common justice should be attended to in this respect: and therefore no request for discontinuance will be now allowed to those few who received one sixth part of our present volume, before sending the notice—nor to those who have not paid for the first volume.

After this time, our terms as to discontinuances will be strictly enforced Orders to discontinue the next volume may be made, and will be properly entered on the list as soon as subscribers may please to send them —but not *after* the commencement of the volume desired to be discontinued.

Extract from the terms published in the 12*th (or May) No. of Vol. I.*

"No subscription will be permitted for less time than a year—nor hereafter, to commence otherwise than at the beginning of a volume. If a subscription is not directed to be discontinued before the first number of the next year has been published, it will be taken as a continuance of the subscription for the ensuing year: and no subscription will be discontinued while any thing remains due thereon, except at the option of the editor."

TO CORRESPONDENTS AND SUBSCRIBERS.

The following communications have been received —*Review of the Life of Oberlin, and remarks on his agricultural and economical improvements—On the climate of Virginia—Gas or Coal Tar—Suggestions, &c. by a correspondent from Granville, N. C.—On Tobacco Culture*, continued, No. 3—*Use of Lime as manure, in Pennsylvania—On the preservation of Tobacco plant beds.*

The next No. will contain an article on the various breeds of cattle, extracted from the latest edition of the most approved English work on this subject. The value of such descriptions greatly depend on the correctness and fidelity with which the plates or figures of the animals are copied—and we have taken much pains, and incurred a heavy expense, to attain that end. The wood engravings which we have procured for this purpose, will well bear comparison with the beautiful originals in the English work, and will do credit to the American artist (Horton of Baltimore,) whose talent is thus exercised for the Farmers' Register.

ERRATUM.

For *Robert Balls*, page 162, read *Robert Batte.*

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